



FRIDAY, MARCH 8.

Some Convenient Methods in Earthwork Measurements.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In arranging the distribution of material in railway construction it often occurs that the grade or location, and sometimes both, is changed several times before the economical arrangement is finally attained, each change involving a restaking or probably a relocation of the portion of the line affected.

To avoid this field work I have adopted the following plan, which may prove useful or suggestive to others under similar circumstances:

The slopes are carefully taken on each side of the centre line for a distance of 200 ft., the distance to points of change of slope being carefully measured, and from these data a close profile of any change of location can be made, provided it does not go outside the 200 ft. Instead of the usual method of platting these slopes to get the side cuttings, I have arranged the following formulae, which any one possessing a moderate familiarity with trigonometry and algebra can in a few minutes verify for himself, so I will not give the demonstration:

Let $2r$ = width of the road-bed, c = centre cut or fill, k = angle of slope of the excavation or embankment, and a = angle of slope of ground. By plus slopes will be meant those sloping toward the centre line and by minus slopes those sloping from the centre line.

We then have for plus slopes in excavation and minus slopes in embankments:

$$\text{Side cut or fill} = \frac{c + r \tan a}{1 - \cot k \tan a} \quad (1)$$

And for minus slopes in excavations and plus slopes in embankments:

$$\text{Side cut or fill} = \frac{c + r \tan a}{1 + \cot k \tan a} \quad (2)$$

For the benefit of those not familiar with algebra the above formula may be expressed as follows:

The slope of the excavation or embankment being one horizontal to one vertical, we have:

Formula (1). Multiply the tangent of the slope angle by one-half of the road-bed and add the centre cutting or filling. Divide this by one minus the tangent of the slope angle.

Formula (2). Multiply the tangent of the slope angle by one-half of the road-bed and add the centre cutting or filling. Divide this by one plus the tangent of the slope angle.

For slopes of one-quarter, one-half and one and a half to one, use respectively one-quarter and one-half of and one and one-half times the tangent of the slope angle in the divisors.

If a change of slope occurs between the centre and the slope stake, multiply the difference of the tangents of the two slopes by the distance out of the change. In plus slopes, if the greater slope is nearer the centre, add the result to the centre cutting, or subtract from the centre fill, and conversely if the reverse is the case. In minus slopes, if the greater slope is nearer the centre, subtract the result from the centre cut, or add to the centre fill, and conversely if the reverse is the case; and use the centre cut or fill as thus corrected to calculate the side cut or fill. Proceed in this way as often as the slope changes, until the slope stake is reached.

For the cut or fill at a point of change in slope, multiply the tangent of the slope angle by the distance out of the change. In excavations add this to centre cut in plus slopes and subtract for minus slopes. In embankments subtract for plus slopes and add for minus slopes.

In case a grade point comes between the centre and slope stake, divide the centre cut or fill by the tangent of the slope angle, which will give the distance of the grade point from the centre; subtract this distance from one-half the width of the road-bed, and substitute this remainder for r in the formulae, or one-half the road-bed in the rules with a centre cut equal to nothing.

The side cut or fill being found, the side distances and areas are calculated by the usual rules. With a little care in the application, the above rules will cover all cases of regular or irregular slopes.

I have also been using a method for taking cross-sections in inaccessible places which has given very good results. The case in hand is a railroad, throughout the entire length of which it is proposed to build a second track. The excavations and embankments are both deep and numerous, and all notes have been lost or destroyed.

The method is as follows:

The position of the cross-section is selected and a base line, usually 100 ft., is laid off at right angles from the central point of the cross-section. It is sufficiently accurate to set this off by the eye. A rope is then placed on the ground in the line of the cross-section, and being laid loosely accommodates itself to the irregularities of the ground. A transit is then set up at the end of the base line and a sight taken on the centre point of the cross-section, and from this line all horizontal angles are measured. A vertical angle is also taken from the horizontal plane of the instrument to the ground at the centre point of the cross-section, the elevation of which is supposed to be known.

The intersection of the cross-wires of the instrument is then brought to bear on the rope at such points as it may be

thought necessary to take measurements, and the vertical and horizontal angles are recorded. This is most conveniently done as a fraction with the vertical angle as the numerator and the horizontal angle as the denominator.

To reduce these notes to a form for calculating or platting the following computations are necessary: The base is multiplied by the tangent of the deflection or horizontal angle to obtain the side distance, and to obtain the vertical distance above or below the instrument the base is divided by the cosine of the horizontal angle and multiplied by the tangent of the vertical angle. This last calculation is most expeditiously made by logarithms.

The distance of the instrument above or below the central point can be found by multiplying the base by the tangent of the vertical angle to the central point, and from this the elevation of the other points computed. These results are recorded fractionally immediately under the notes from which they are calculated.

We find that a party, consisting of one man to keep the notes, one transit man and two men to handle the rope, can go over about a mile and a half of this heavy work in a day, taking sections every 100 ft. with some instruments, and the same party can do about the same amount of work in reducing these angular notes to linear distances in the office, so the progress is about three-quarters of a mile per day, with the advantage of doing the office work in bad weather, thus utilizing the entire time.

It would be almost impossible to take the cross-sections on this work with the bar and rod, and very slow and tedious with the level.

For most purposes the method is very accurate, since all transits are graduated to minutes, if not finer, and an error of one minute even in an angle of 45 degrees would require a base line of over 300 ft. to amount to one-tenth of a foot in linear, horizontal or vertical distance.

This method might be applied with very good results to tunnel work, by placing the point of a rod on each point of the section to be measured to, thus showing the purpose of the rope, by making sure that all the observed points are in the same plane.

Laying Out Frogs and Switches.

MONTGOMERY, Ala., Feb. 6, 1882.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following may be interesting to some of your readers. It is extremely simple, but answers with me for the solution of problems relative to frogs and switches which are some-



Fig. 1.

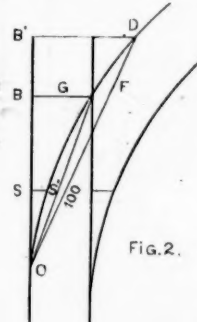


Fig. 2.

what intricate as demonstrated by Henck, Shunk and other eminent mathematicians.

Switch angles are objectionable, and easily avoided by driving a spike in the middle ordinate of the switch rail. The curve, then, begins at the initial point of the switch rails. BC , fig. 1, the tangential distance of any point C of a circular curve varies directly as the square of the measured distance OC so nearly that the error is an infinitesimal one for short distances, and may be neglected.

Fig. 2 represents the rails of a turn out from a straight line. Let d = the degree of the turn-out curve $OD = 100$ feet; then $B'OD = \frac{d}{2}$ and $B'D = \text{nat. sin. } \frac{d}{2} \times 100$; $BF = G$ = gauge of track; SS' = throw of switch. Given SS' , d and G to find OS = length of switch rail, OF = frog distance and angle of F .

$$B'D : BF :: OD : OF \text{ or } B'D : G :: (100)^2 : OF^2$$

$$OF = \left(\frac{1000 G}{B'D} \right)^{\frac{1}{2}}$$

$$\text{Again, } B'D : SS' :: (100)^2 : OS^2, OS = \left(\frac{1000 SS'}{B'D} \right)^{\frac{1}{2}}$$

$$\text{Having obtained } OF, \text{ frog angle} = d \times \frac{OF}{100}$$

Perhaps it is simpler to use the natural sine of one foot instead of 100 ft. Thus:

$$\text{Nat. sin. } \frac{d}{200} : G :: (1)^2 : OF^2, OF = \left(\frac{G}{\text{nat. sin. } \left(\frac{d}{200} \right)} \right)^{\frac{1}{2}}$$

$$\text{and nat. sin. } \frac{d}{200} : SS' :: (1)^2 : OS^2$$

$$OS = \left(\frac{SS'}{\text{nat. sin. } \left(\frac{d}{200} \right)} \right)^{\frac{1}{2}}$$

If two curves leave each other in the same or opposite direction, the value of the above quantities will be the same as if a curve whose degree is equal to the difference or sum of their degrees left a straight line.

It will be seen at once that the tangential distance of a

curve varies as the square of the measured length only for a short distance, probably 150 to 200 ft.

The middle ordinate of a chord is equal to one-fourth of the deflection at the end of that chord because it is equal to the deflection of half the chord.

R. E. HARDAWAY.

The "Westinghouse Automatic" in Relation to the Spuyten Duyvil Accident.

BOSTON, Mass., Feb. 27, 1882.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest articles in the papers relating to the Spuyten Duyvil accident and the cause thereof, some ascribing the stoppage of the train to the pulling of the safety cord, and others to the brake "creeping" on. Realizing that "a little learning is a dangerous thing," I will endeavor to show to such of your readers as are unacquainted with the construction and operation of the automatic brake the impossibility of the brake "creeping" on 13 cars at once.

The essential feature of the automatic brake is that a reduction of pressure of from 5 to 20 lbs. in the brake pipe (which extends the whole length of the train) instantly causes the brakes to apply themselves. When the engineer applies the brake he turns the handle of the engineer's brake valve, which first cuts off communication with the main reservoir and then allows a portion of the air in the brake pipe to escape. To release the brakes, he turns the handle of the valve to its former position, allowing air to flow from the main reservoir to the brake pipe, thus restoring the pressure. The brakes are also applied by opening the "conductor's" valve to which the safety cord is attached, by the bursting of a hose or pipe, or by the separating of the train. Special provision is made against leaks in the train causing the brakes to "creep" on by cutting what is called a "leakage groove" in the brake cylinder, which allows air feeding slowly into the cylinder to escape past the brake piston into the atmosphere. A leak, therefore, which could cause the brakes to fully apply themselves to 13 cars and bring the train to a stop despite the utmost efforts of two powerful locomotives could only be caused by the bursting of a hose or pipe or by the opening of the "conductor's" valve by the pulling of the safety cord. The evidence at the inquest tended to prove it was the latter which caused the stoppage by allowing a volume of air to escape through a $\frac{1}{4}$ in. opening from the brake pipe into the atmosphere, thus reducing the pressure and causing the brakes to apply themselves. It was then the positive and imperative duty of the engineer of the second engine, when he felt the brakes go on, to instantly turn the handle of the engineer's brake valve as if to apply the brakes himself, and by so doing cutting off the escape of air from the main reservoir, and after the train had stopped to ascertain the cause and remedy it. He could then have restored the pressure in the brake pipe, and the brakes would have come off as readily and quickly as though making an ordinary stop.

This he failed to do, and the air pressure, according to his own testimony, went down from 75 to 40 lbs., thus depriving him of the power to restore the original pressure in the brake pipe necessary to release the brakes, and rendering him responsible in his own individuality for the loss of life which followed.

CHAS. H. ATKINS,
Automatic Brake Inspector,
Massachusetts Central Railroad.

A Mechanical-Electro Block Signal.

Recent accidents on some of our most prominent railroads have called the attention of railway officials to the necessity of having some means, in addition to those commonly employed, for the prevention of rear collisions.

The signal illustrated by the engravings is an electric block signal in operation on the New York & New England Railroad, which is claimed to be the most simple automatic signal ever used.

Mr. Charles J. Means is the inventor, and the patents are controlled by the New England Signal Company.

One feature of this signal which distinguishes it from any other is the setting of the signal at danger mechanically, by means of a lever which is depressed by the wheels of a passing train, no electricity being used, while heretofore the mechanism for setting the danger signal has been controlled by an electro magnet. After the signal has been set at danger the mechanism is locked by a latch lever bearing the armature of an electro-magnet, which is charged by the train passing over a simple track circuit-closer, located about a mile from the signal, thus causing the display of the safety signal in a manner which will be understood by reference to the accompanying figures. Fig. 1 is a view in perspective of the signal-house and the signal-setting mechanism. Fig. 2 and 3 are views of the track circuit-closer. In fig. 4 is a circular window, 20 in. in diameter, in the signal house, through which one of the disks B or C is always displayed. These disks are white and red respectively to indicate "safety" and "danger," and are attached to a lever D pivoted at a . The disks can take two fixed positions; one as shown, which indicates safety, and the other shown by the dotted lines, in which the red disk is swung in front of the window, thus indicating danger. b is a weight overbalancing the weight of the signal disks, thus tending to swing them into the danger position. E is a pulley on the lever D , to the circumference of which is fastened one end of a chain c . The other end of this chain is attached to one extremity of a rocking lever F , pivoted at d . G is a weight hung from the rocking lever F , which overbalances the weight b on the lever D , thus normally holding the disks in the safety position, as shown. e is a row of teeth on the rock-

ing lever *F*. *H* is the armature lever of the electro-magnet *h*, having a hook-shaped end which engages with the teeth *e* when the rocking lever *F* is pulled into the position represented by broken lines. *J* is a hook, suspended from the rocking lever *F*, which interlocks with a hook *g*, on one end of a rod *K*, whose lower extremity is pivoted to an arm *L*, welded to a rock shaft *M*, mounted in suitable bearings *k*, *k'* on a cross-tie *m*. *N* is an arm also welded to the rock shaft *M*, a part of which projects about three-eighths of an inch above the top of the rail *O*. *n* is a short arm welded to rock shaft *M* and projecting in an opposite direction from arms *L* and *N*; *p* is a stiff spring which presses downward on the arm *n*, thus normally keeping the arm *N* above the rail *O*; *v* is a detent which limits the upward movement of the arm *N*.

The operation of the signal setting mechanism is as follows:

Suppose the signal-house to be placed at the entrance of a section of track one mile in length. A train entering this section depresses the arm *N*, and consequently the arm *L* on the rock shaft *M*. This downward movement of the arm *L* is extended to the rocking lever *F*, by means of the rod *K*, and hooks *g* and *J*, thus pulling the teeth *e* into engagement with the armature lever *H*, which locks the rocking lever *F* in the position shown by the dotted lines. At the same time the weight *G* being raised, and the chain *c* being slackened, the signal disks gently turn to the danger position by the action of the weight *b* on lever *D*. The rock shaft *M* and its arms *N* and *L* return to their normal position by the action of the spring *p*, but upon the upward movement of the rod *K* the hook *g* moves independently of the hook *J*. In order to release the rocking lever *F* to allow the weight *G* to pull the signal disks to the "safety" position, the electro-magnet *h* must be charged. *P* is a battery one pole of which is attached by a conducting wire *q* to the rails of the track. The other pole is connected to one end of the coils of electro-magnet *h* by wire *o*. *S* is a wire attached to the other end of the coils and extends on the telegraph poles to the track circuit-closer, shown in figs. 2 and 3, which is located at the exit end of the section of track guarded by the signal. In these figures *O* is the track, *R* is a steel bar 10 ft. in length, securely bolted throughout the entire length to an oak joist *T* 2 in. square, which gives it rigidity. *V*, *V*¹, *V*², are stiff, flat springs, one end of each of which is bolted to the under side of the joist *T*, while the outer ends are clamped in solid iron supports, *W*, *W*¹, *W*², which are screwed to the ties. *X*, *X*¹, *X*² are iron detent blocks, which limit the upward movement of the springs *V*, and are of sufficient height to allow the steel bar *R* to project slightly above the top of rail *O*. The detent blocks *X* are beveled, as shown in section in fig. 3, so that any snow or ice that may form around the spring *V* is forced to one side. *S* is the wire which comes from the signal magnet and is soldered to a plug in metallic connection with the bar *R*.

The operation is as follows:

We have seen how a train causes the display of the danger signal at the entrance of the section by pulling the rocking lever *F*, fig. 1, downwards, the said lever being locked by armature lever *H*. The wheels of a train running on the steel bar *R*, fig. 2, at the exit of the section, make a metallic connection between the bar *R* and the rails *O*. An electric current then flows from the battery *P*, fig. 1, through the wire *o*, electro-magnet *h*, wire *S*, steel bar *R*, the car wheel and thence along the rails *O* to the wire *q*, and back to the battery. This current charges the electro-magnet *h*, which attracts its armature *H*, disengaging it from the teeth *e* on the rocking lever *F*, thus allowing the weight *G* to pull it and the signal disks *B* and *C* back to their original position, indicating that the section of the track is clear.

Any failure of the battery or breaking of the conducting wires will result in the continued display of the danger signal until the defect is remedied.

The track circuit-closer is claimed to be the most simple device ever used for the purpose. It readily yields to the wheels of a train, consequently there is little wear and tear.

The Leclanché battery, which is employed for ringing the electric bells in hotels and offices, is employed, and will run for six months without attention. It need not be placed at the signal, but in any convenient building in the current of the wire *S*.

The details of construction are not shown in fig. 1. Suffice it to say that the parts are mounted on a substantial metal base and arranged in compact form.

As the disks turn to the danger position, they press together circuit-closing springs causing an alarm bell to ring at the nearest station. This not only serves as a warning to the agent and passengers, but also indicates that the signal is in good order.

Fig. 4 is an elevation of a short section of road equipped with these signals, showing the relative position of the signals and the track circuit closers. The trains run in the direction of the arrow. The signal *A* is placed at the initial point of the series of signal sections. The first section extends from the signal *A* to the track circuit-closer *A*¹, and the next section from the signal *B* to the track circuit-closer *B*¹, and so on indefinitely. The operation of the system is as follows: The train entering the section *A A*¹ has set the signal *A* at danger: upon reaching the signal *B* it will set that at danger, and after passing a train's length beyond the signal *B* will run upon the track circuit-closer *A*¹, thus changing the signal *A* to safety. The same operation continues along the entire road as the train proceeds from section to section. The object of overlapping the sections—that is, the placing of the track circuit-closer *A*¹ a train's length

beyond the signal *B*—is to prevent the display of the signal *A* at safety until the whole train is protected by the signal *B*, whereas if it were placed at the signal *B* a train becoming disabled while passing it would be entirely unprotected, since the signal at *A* would be changed to safety simultaneously with the setting of the signal *B* at danger, conse-

quently no signal would be displayed in the rear of the train. anything is gained by their use and that the wear and tear are necessarily great.

Sending Back Rear Brakemen.

Under date of Feb. 20, the Massachusetts Railroad Commissioners have addressed the following circular, directed "to the presidents and directors of the several corporations operating railroads in Massachusetts:"

The disaster which occurred on the New York Central & Hudson River Railroad Jan. 13 last has called the attention of the public and of railroad men, among other things, to the rules in force on railroads governing the action of the

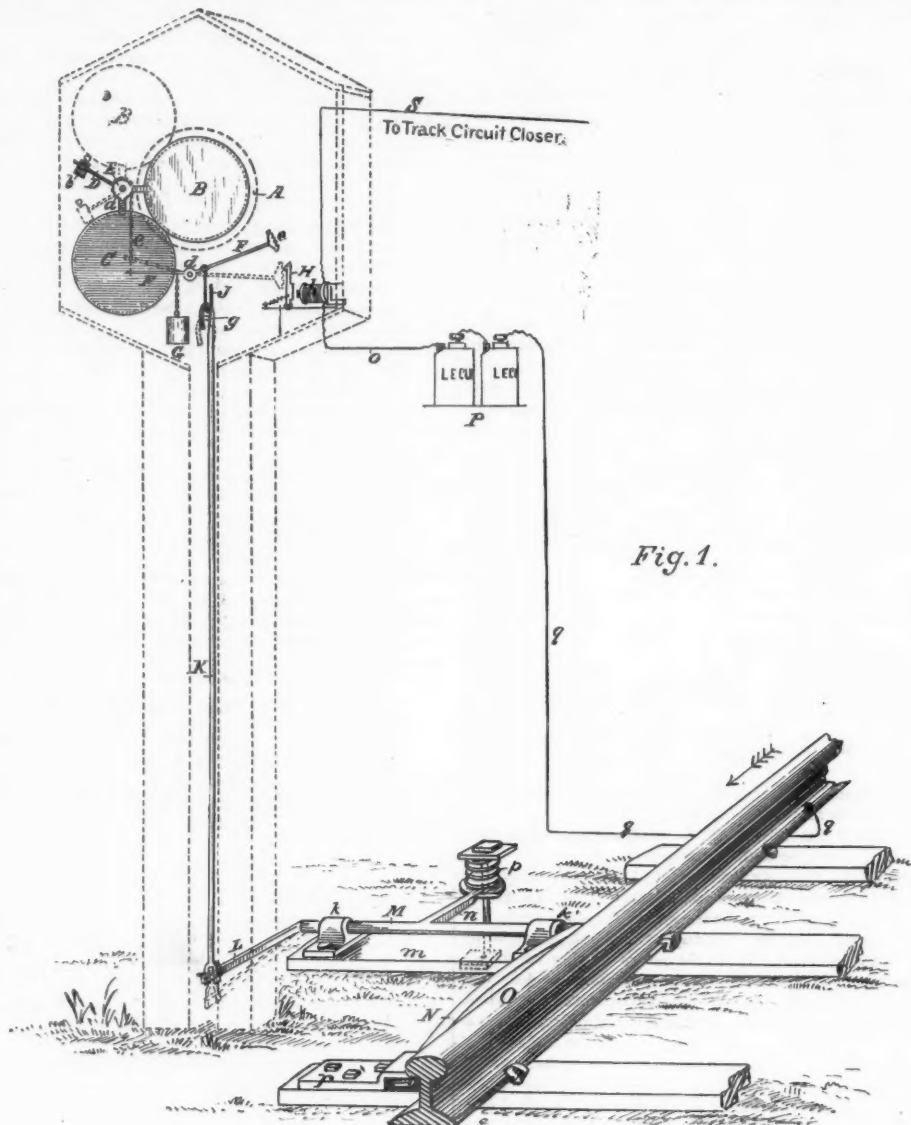


Fig. 1.

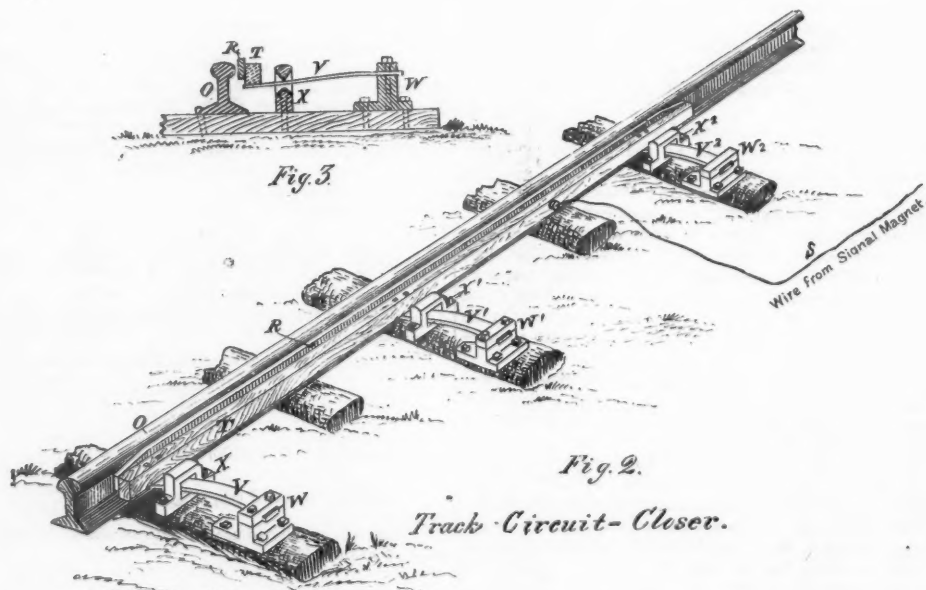


Fig. 2.

Track Circuit-Closer.

MEANS' ELECTRIC BLOCK SIGNAL.

rear brakeman in case of an unusual stop of his train. The Commissioners have had their attention called to this subject by direct appeals, and by letters also. They consider it their duty to ask your attention to the following statements:

The rules now in force on various railroads are illustrated by the examples which are annexed.

Concerning these rules, this is what good railroad authority has said: "The experience, we think, of nearly all railroad superintendents will sustain the assertion, that it is practically impossible to have that rule obeyed with any reasonable degree of certainty." And the Commissioners believe that while it is undoubtedly true that the rule is often carried out, that rear brakemen are left behind and are carried in by a following train, yet in the majority of cases the rules are not strictly followed, and hundreds of opportunities are given for accidents for every disaster which occurs. It is incumbent upon all railroad men, therefore, to see whether the enforcement of the rules looking to a prevention of rear collisions cannot be made more certain, and the large number of rear collisions be thereby materially diminished. One means to that end would seem to be a revision of the rules themselves. The rules now in force are persistently violated on account of the condition contained in them (which is mandatory in some of them), that the rear brakeman must be left on the track. This is such a burden to him in most cases, and would have to be endured in the ordinary course of train service so often without his giving actual warning to a following train, that none but the most conscientious can be relied upon to persistently obey it. Besides, the opinion is universal among trainmen, and even a railroad superintendent has openly expressed it, that "It is quite important to have the men come in on their train." In one sense it is, of course. One man left behind makes one less man on the train for the rest of the trip, and there are never too many at the start. This man coming in at an irregular time, may, in a measure, disarrange train service at some future time, that or the following day. And extreme regularity of service, is, of course, a thing to be sought after, and is in itself a safeguard against accident.

The essential points in a rule of the kind under discussion seem to be as follows:

1. The rear brakeman is to go back at once, and without waiting for special orders to do so. The responsibility to do so should be upon him and he should clearly understand this to be the case and be reminded of it from time to time.

(The New York Central & Hudson River Railroad rules do not clearly require the brakeman to go back; they require the conductor to send him back, and this omission was promptly claimed as an excuse by the delinquent brakeman in case of the disaster of Jan. 13.)

2. The rule requiring him to do so should be printed among the rules governing the action of brakemen, rather than among general train rules.

3. As an additional safeguard, it should remain the duty of the conductor to see that the rear brakeman has set about obeying the rule which requires him to flag back whenever

ance with Rule B.; and should a passenger train stop at any unusual point on the road, the rear brakeman must go back immediately, and be governed by the same rule.

"When a freight train stops at its regular stopping place, where the rear brakeman can plainly count back 20 telegraph poles (see back half a mile) standing at the rear of his train, he must go back with danger signals not less than two telegraph poles, and as much farther as may be necessary to insure stopping the following train; but if he cannot plainly count back 20 telegraph poles (see back half a mile), or if his train stops at any point that is not its regular stopping place, the rear brakeman must go back until the number of telegraph poles which he has passed, and which must not be less than four, added to those which he can count in the direction in which he is going, shall add up not less than 13; always bearing in mind, that if from any cause his train should be detained, so as to come within twenty minutes of the time of a passenger train following, he must be governed strictly by Rule B.

"When it is necessary to cross over to the opposite track, or to protect the front of the train from any cause, the same precautions must be observed by the fireman, but if the fireman is unable to leave the engine, the front brakeman must go in his place.

"B. When an accident occurs to a train, or if by any other cause the road is obstructed, the rear brakeman must go back with danger signals immediately, to stop any train or engine which may be following. Employees must bear in mind that EXTRA TRAINS AND ENGINES ARE AT ALL TIMES TO BE EXPECTED, and therefore the most careful compliance with the precautions for safety is necessary. The rear brakeman shall continue to go back until he has either passed 20 telegraph poles (half a mile), or passed part of that number, but not less than five, and count enough more in the direction in which he is going to make up the 20 telegraph poles (half a mile), and he must remain in a position so taken, covering 20 telegraph poles back of his train until recalled by the whistle of his engine. When recalled he must, before leaving his position, light a day or night standard fusee signal. In foggy weather, snow-storms or at night, use the night signals; in clear weather, by day, use the day signals.

"After reaching his train he must continue to drop lighted fusee signals on the track, at intervals, as long as the rear of the train is in danger from a following train.

"If the accident occurs upon single track, or if on double track and both tracks are obstructed, the fireman must go forward a like distance, and use the same precautions to protect the train from any train coming in an opposite direction. If from any cause the fireman is unable to go forward promptly, the front brakeman must go in his place.

"C. When it becomes necessary for the brakeman to go back to protect the rear of his train, the next brakeman shall immediately take the rear brakeman's position on the train, and remain there until relieved by the rear brakeman; and on passenger trains the baggage-master shall take the place of the front brakeman whenever necessary.

rail; he shall then continue to go back at least 1,200 yards from the rear of his train, and place two explosive caps on the rail three yards apart, when he may return to a point 900 yards from the rear of his train, and he must remain there until recalled by the whistle of his engine; but if a passenger train is due he must remain until it arrives. When recalled, he will remove the explosive cap nearest to the train, but the two explosive caps must be left on the rail, as caution signal to any following train.

If the accident occur upon a single track, or if on double track, and both tracks are obstructed, the fireman shall go forward a like distance, and use the same precautions to protect the train from any train coming in an opposite direction. The conductor, as well as the engine-man, is required to know that the fireman performs this duty, and if from any cause the fireman is unable to go forward promptly, the front brakeman shall be sent in his place.

87. When it becomes necessary for the flagman to go back to protect the rear of his train, the next brakeman shall immediately take the flagman's position on the train, and remain there until relieved by the flagman; and on passenger trains the baggage-master shall take the place of the front brakeman whenever necessary.

Conductors are required to strictly enforce this rule.

Rules and Regulations for Operating Railroads, Devised by a Committee of Railroad Managers.

(From the Report of the Board of Railroad Commissioners for 1872.)

36. If any train breaks down, stops or is delayed from any cause, on the road, the first duty of the conductor, and of all persons connected with the train, is to see that efficient measures are taken to prevent other trains from running into the delayed train. One, and in case of danger, two efficient men, must be sent backward or forward, or both, as the case may require, with red flags or lanterns, at least half a mile, to stop any approaching train. No wish to have the signal-men go on in the delayed train must prevent their going forward or backward at least half a mile, and staying there till the approaching train is stopped; and if a second, third or fourth train is to follow, the same precautions must be observed until the track is clear for any following train.

9. Torpedoes must be used in addition to flags or lanterns, whenever, in case of accident or delay, there is any liability that the signal flag or lantern may not be seen, by reason of fog or otherwise. Enginemen, station and section foremen should always be supplied with them. When a torpedo is exploded by the engine passing over it, the train must be stopped immediately.

Old Colony Railroad.

(Measures to be taken in cases of accidents and delays.)

16. In case of accident or delay to a train or engine, or of obstructing the track in any manner, the first duty of the conductor and of all persons connected with the train or engine, is to see that the most efficient measures are taken to protect such train or engine, and to stop promptly any

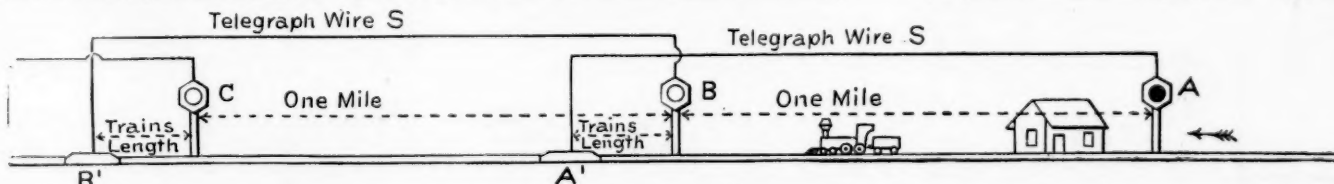


FIG. 4.

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the time comes for him to do so. The Commissioners question whether it be well to divide the responsibility still further, and make it the duty of all the train hands to see that the rule is carried out, as done in some of the rules above printed.

4. The brakeman should go back far enough for safety, in every case; but should not be required to go back a fixed length or distance in all cases. A requirement of this sort brings the rule into contempt almost as a matter of course. If twenty telegraph poles (one-half a mile) be the standard distance from the signal to the delayed train for foggy weather, or in a snow-storm, or to guard against curves, then a less distance is equally ample on a straight tangent and in clear weather. Would it not suffice to insist that the brakeman should either pass twenty consecutive telegraph poles, or pass part of that number and be able to count the balance from where he stops, in all cases? The principal involved being this: that in bad weather, or on account of curves, the flagman would be obliged to pass more poles, and count a less number ahead, in order to comply with the rule, while in clear weather and on a straight line he could pass the minimum number and count the balance; and in either case the certainty would be attained that the engineman of the coming train could see the flagman as great a distance ahead as the flagman had counted telegraph poles back of the delayed train. Experiment convinces me that it is difficult to count back more than fifteen or sixteen poles with certainty, but if every fifth pole were marked with a cross-board or with a target, twenty poles could be counted with certainty. It is also a question whether fifteen telegraph poles (about 2,000 ft.) is not far enough, and twenty telegraph poles can be covered by passing five of them and counting fifteen more.

5. Facilities should be afforded for being able to call in the brakeman without a sacrifice of safety. The regulations of the Fitchburg Railroad seem to be very successful in doing this. The means to give warning in the absence of brakemen have been torpedoes placed on the rail, special flags and fuses. Torpedoes fail with annoying frequency in snowy weather, being brushed from the rail at those times by the snow and ice pushed ahead of the engine. They have the defect also of giving no indication as to the length of time elapsed since they were put on the rail. Special flags are good, of course, only in clear weather and by daylight. Fuses seem to deserve a wider application in this state than they have hitherto had. They are said to be especially valuable in a driving snow-storm, as they illuminate the whole track and the falling snowflakes. And the feature of having them burn only a stated length of time must commend itself at once as a valuable help in railroad service. If it were desired to make a day fusee signal, it could easily be done by burning some mixture compounded so as to produce a large volume of heavy smoke instead of a red light, as in night signals.

As an example: if the rules of the Pennsylvania Railroad were rewritten, with a view to incorporating in them the above suggestions, they would read somewhat as follows:

RULES GOVERNING THE ACTION OF BRAKEMEN.

"A. When a passenger train is delayed at any of its regular stops more than five minutes, the rear brakeman must go back with danger signals, to protect his train, in accord-

RULES GOVERNING THE ACTION OF CONDUCTORS.

"Rule O. Conductors must in all cases of delays or unusual stops immediately see that Rules A, B and C, governing the action of brakemen, are strictly carried out.

RULES GOVERNING THE ACTION OF FIREMEN.

"Rule V. Firemen will read Rules A and B governing the action of brakemen, and will act accordingly.

RULES GOVERNING THE ACTION OF ENGINEMEN.

"Rule T. Enginemen must in all cases of delays or unusual stops immediately see that Rules A and B, governing the action of brakemen, so far as they apply to the duties of the firemen, are strictly carried out.

RULES GOVERNING THE ACTION OF BAGGAGE MASTERS.

"Rule X. The attention of baggage-masters is called to Rule C, governing the action of brakemen, and they will act in accordance with that rule."

At best, the rules which provide for the sending of signals from a delayed train to the rear or front are but a poor staff to lean upon in the event of a frequent train service.

And the Commissioners cannot take leave of the subject without recalling to all the railroad managers of the commonwealth the superior safety afforded against rear collisions by the good forms of interlocking or of automatic block signals, rapidly coming into use in this country and abroad.

By order of the Board,

WM. A. CRAFTS, Clerk.

RULES REFERRED TO IN THE FOREGOING CIRCULAR.

Pennsylvania Railroad.

(Rules governing the action of the rear brakeman in case of unusual stops.)

85. When a passenger train is delayed at any of its regular stops more than five minutes, the flagman shall go back with the danger signals to protect his train, in accordance with rule No. 86; and should a passenger train stop at any unusual point on the road, the flagman shall go back immediately, and be governed by the same rule.

When a freight train stops at its regular stopping places, where the rear of the train can be plainly seen by a following train, at a distance of at least one-half mile, the flagman shall go back with danger signals not less than 100 yards, and as much farther as may be necessary to insure stopping the following train; but if the rear of his train cannot be plainly seen at a distance of at least one-half mile, or if it stops at any point that is not its regular stopping place, the flagman must go back not less than 600 yards—always bearing in mind, that if from any cause his train should be detained, so as to come within twenty minutes of the time of a passenger train following, he must be governed strictly by rule No. 86.

When it is necessary to cross over to the opposite track, or to protect the front of the train, from any cause, the same precautions shall be observed by the fireman; but if the fireman is unable to leave the engine, the front brakeman shall be sent to his place.

86. When an accident occurs to a train, or if by any other cause the road is obstructed, the flagman shall immediately go back with danger signals to stop any train or engine which may be following. At a point 600 yards from the rear of his train, he shall place one explosive cap on the

train or engine that may approach from either direction. An efficient man (and in all cases of more than ordinary danger, two men) must be sent backward or forward, or both ways, as the case may require, with the proper red signals and torpedoes, at least a half mile (twenty telegraph poles), or further if upon a curve or grade, to stop any approaching train or engine. No wish to have the signalmen go on in the delayed train must prevent their going forward or backward at least a half mile, and staying there till the approaching train or engine is stopped, or the track is clear, or the whistle is sounded for their recall; and when recalled, the signalman must not leave his post until he has placed a torpedo on the rail, which must be left on the rail as a caution signal to any approaching train or engine, except that a torpedo need not be left on the rail in cases where a delayed train has side-tracked and the main track is known to be clear. Trains or engines will not attempt to cross from one main track to or over the other unless thoroughly protected by the proper signals.

This rule is of the very greatest importance; and the conductors and trainmen must be sure that efficient men are set with special instructions to stop approaching trains. All trains will avoid stopping, if possible, where there is danger from other trains.

In cases of accident or delay, or obstruction of the track, or when crossing from one track to another, employees must not fail to bear in mind that EXTRA TRAINS AND ENGINES ARE AT ALL TIMES TO BE EXPECTED, and therefore the most careful compliance with the precautions for safety is necessary.

Fitchburg Railroad Co.

(Copied from "General Rule," pages 10 and 11, Rules 32 and 33.)

32. In case of an accident, or when a train is unable to proceed at the rate of speed, or is delayed or stopped from any cause, excepting only the regular stops made on time at stations, the first duty of the conductor, engineer and all other employees is to see that efficient measures are taken to stop other trains before reaching the obstruction or imperfection in the track or the delayed train. One, and in case of danger two, efficient men with suitable instructions, each of whom must be provided with a red flag by day and two red lights (as one may be broken), and hand and standard fusee signals by night, must always be sent out, backward or forward, or both, as may be necessary, to stop any trains which may be approaching. This must always be done (whether any train is known to be approaching or otherwise) at all times and in all places, however brief the stoppage or detention; and such signalmen must proceed, with signals displayed, to a distance of at least half a mile from any point of danger arising from any obstruction or imperfection of track, or from any train which may be delayed or stopped. No wish to have signalmen go on in the delayed train must prevent their going backward or forward the above-mentioned distance and staying there until the approaching train is stopped or until it is safe to recall them. If a second, third, or more trains are to follow, the same precaution must be observed until the track is clear for any following train; and when a train that is followed by another train is obliged for any cause to stop on the road, the brakeman on the rear car

should start even before the train has come to a full stop. Trains having occasion to stop on the track from any cause must, if possible, stop where the view is long and clear. In sending for assistance, it must be stated explicitly what is needed, and the nature of the accident.

33. Whenever the nature of an accident or detention is such that the train may be delayed a considerable time, additional men must be immediately sent to the nearest station in one or both directions, as may be necessary, to stop all approaching trains, and immediate notice given, by telegraph or otherwise, to the Superintendent of Motive Power and Assistant Superintendents.

(Copied from "Special Rules and Regulations," time-table No. 33, page 3.)

22. The rear car of all trains must be supplied with two or

on all night trains will be furnished with standard and hand self-igniting fusee signals, which will display a red light. They must always, before leaving Boston, Charlestown or Fitchburg, know that the tin boxes provided for the purpose contain a full supply. The standard signals burn ten and the hand signals five minutes.

28. When a train is delayed, or loses time before stations, from any cause, so that the rear of the train will be in danger from a following train, the rear brakeman will, at intervals drop off standard signals, in accordance with the following instructions printed on each signal, and try to drop them so that the sharp point will penetrate a sleeper or the ground and hold the signal in an upright position:

"To ignite the fusee, remove the cap, and strike the end (plumb down) on any hard substance; hold the fusee for a

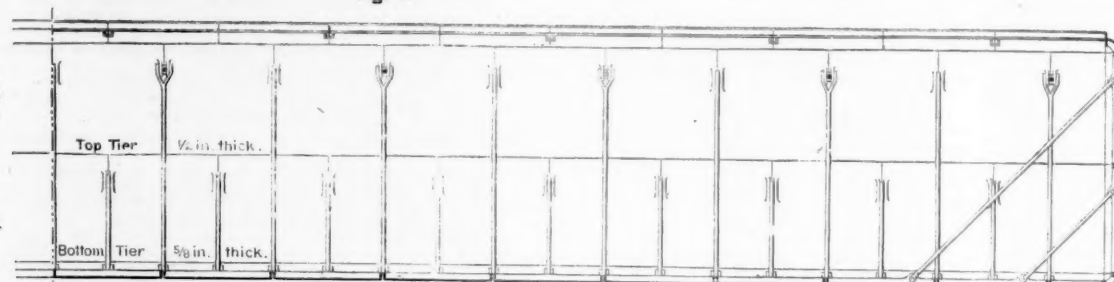
guished; care being used not to light them until a train is seen or heard approaching, as they only burn five minutes.

32. Hand or standard signals will be left by brakemen as a danger signal during the time they are returning when they are called in from signaling a following train, when necessary to insure perfect safety.

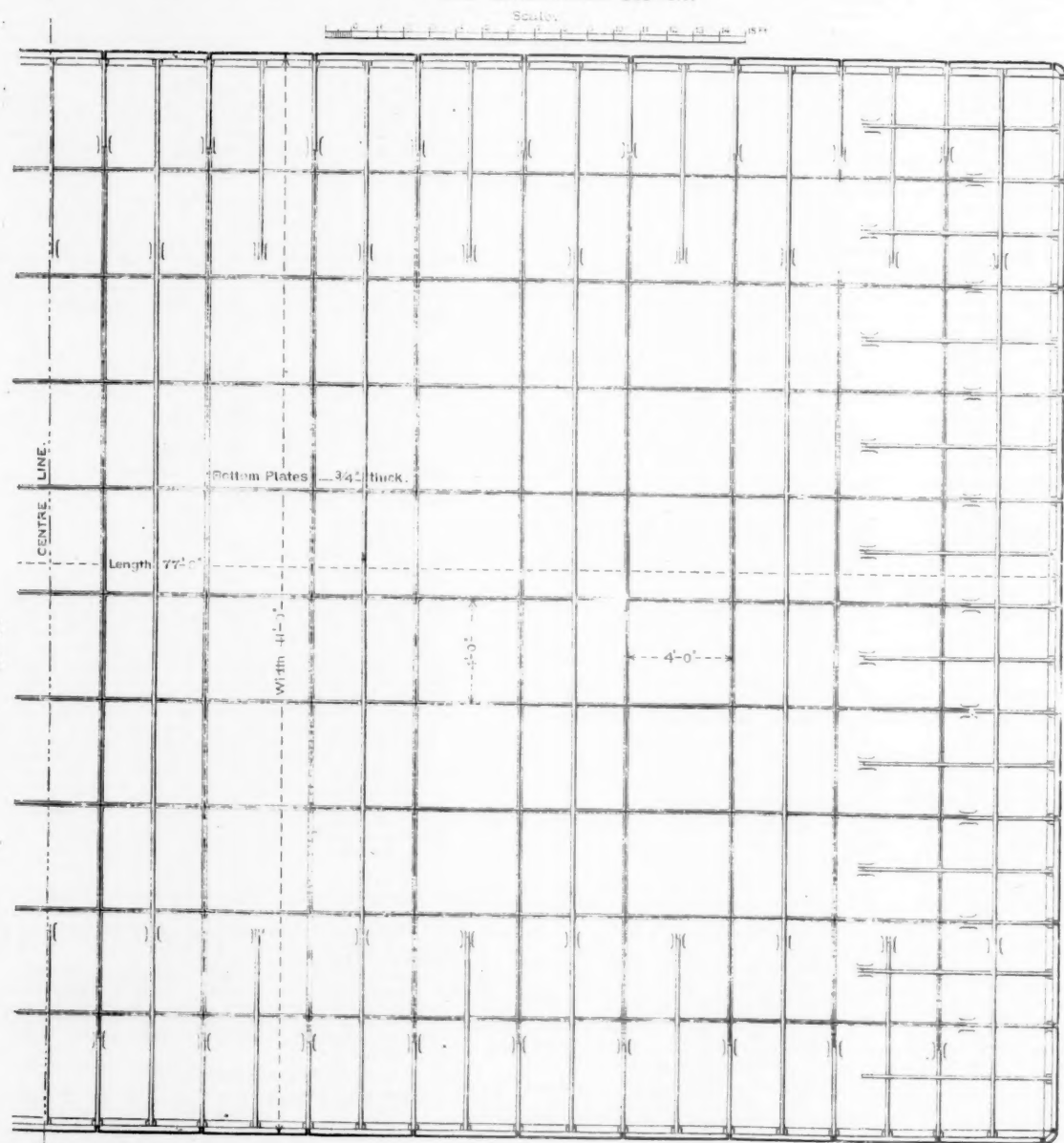
33. Conductors will be held responsible for the strict observance of these rules—they must see that brakemen understand them, and must give their personal attention to their use, and be sure that sufficient precautions are taken to insure perfect safety from any following train.

34. When any are used, conductors must report to General Superintendent, Boston, the number used, and the reason for using the same.

Fig. 1.



HALF LONGITUDINAL SECTION.

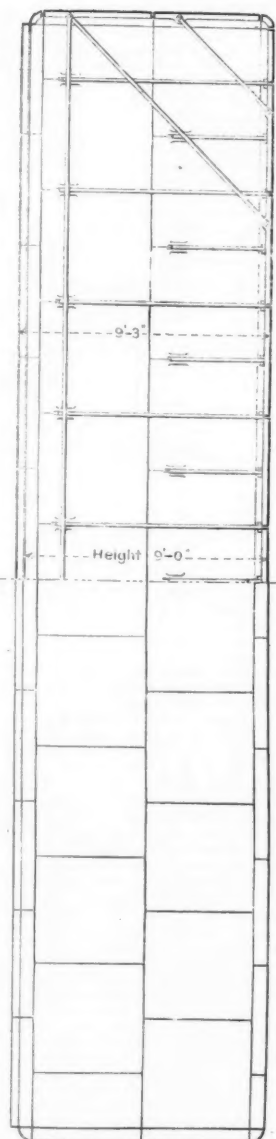


HALF PLAN

Fig. 2.

CAST-IRON WATER TANK, CAPACITY 177,000 GALLONS.

London, Brighton & South Coast Railway. Wm. Stroudley, Locomotive Superintendent.



HALF TRANSVERSE SECTION.

HALF ELEVATION.

Fig. 3.

more flags made one-half red and one-half blue, with handles to fasten into the sleepers, which the rear brakeman must always take with him in addition to his flag when he goes back to protect the rear of his train; and in all cases on curves, down-grade, or in all cases where it is not perfectly safe to remove the danger signal, he will fasten it in the centre between the rails tight enough not to be blown down by the wind, and leave it where it will be taken up by the next train following, if stopped in time, and if not, by the sectionmen, and left at the next station for the train leaving it. Enginemen of all trains approaching such signals, must, unless they have positive knowledge, by telegraph or otherwise, that the trains leaving such signals have arrived at the next station, immediately reduce the speed of their trains so that they can be stopped within seeing distance on straight line or in approaching or running around all curves.

27. In order to insure greater protection to trains that may be stopped or detained on the road, the rear-brakeman

moment or two, to insure perfect ignition. And if to be thrown off the train, let it drop so as to avoid needless concussion."

29. On arrival at the first regular stopping-place, if there is not a signal box located at such station and in use at the time, the station agent must be notified of the cause of the delay, and instructed to stop the following train and give full particulars to the engineman and conductor.

30. Enginemen observing these burning signals, must bear in mind they indicate a train has passed that point less than ten minutes in advance of them—they must immediately reduce the speed of their train to such a rate that they can be stopped within sight of and before reaching any train on the straight lines or on the curves, and run at such rate until definite information is obtained in regard to the train which left the signal.

31. Hand signals are to be carried with standard signals and red lights, by men sent to stop approaching trains, and are to be used in case a lantern is broken, or a light extin-

35. A supply of these signals must be kept on hand by Yard-master, Charlestown, and Depot-master, Boston, to whom conductors must apply for them.

New York Central & Hudson River Railroad.

(Copied from the Railroad Gazette, 1882, page 43, Rules 53 and 54.)

53. Whenever a train is stopped on the road, or is only enabled to proceed at a slow rate, the conductor must immediately send a man with a red signal at least half a mile back on double track, to stop any approaching train, which signal must be shown while detention continues. This must always be done, whether another train is expected or not. In carrying out this instruction the utmost promptness is necessary; not a moment must be lost in inquiry as to the cause of stoppage or its probable duration; the rear brakeman or trainman must go back instantly. Conductors will

be held strictly responsible for the prompt enforcement of this rule.

54. The signalman sent back must not return to the train on the blowing of the whistle to start, nor unless sent for by the conductor, and then must first place two torpedoes upon the rail.

Cast-Iron Water Tanks.

The common use of cast-iron water tanks on English railroads is a feature which attracts the attention of an American engineer as soon as he begins to examine into the details of their equipment and permanent works. As such tanks are, so far as we know, not used at all on American railroads, it has been thought that our illustration, showing the details of their construction, would be useful and interesting to many of our readers. The engravings herewith are from drawings of a very large tank for the London, Brighton & South Coast Railway, which has recently been erected at Brighton, and has a capacity of 177,000 gallons. For the drawings and an opportunity of examining the construction of the tank we are indebted to the courtesy of Mr. Stroudley, the Locomotive Superintendent of that line.

plates, where they bear against each other, are planed, but in others the rough castings are bolted together without any other fitting than to chip off the ragged edges. It will be noticed that the corners are formed of a piece which makes a "quarter turn," or a round corner.

On the sides the plates are put in so as to break joints. With the pattern for the side and corner plates, tanks of any size can be built up. The sides and ends are braced with diagonal braces as shown, and the former with transverse rods extending from one side to the other, as indicated in figs. 2 and 3. Figs. 2 and 3 represent only one-half of the tank, its centre line being shown on the left side of the engravings.

These tanks are generally placed on top of a one or two-story building with heavy brick walls, the round corners being allowed to project over the edges of the wall, as shown on the right lower corner of fig. 4. In this country such tanks would either need to be protected from the cold to prevent their freezing, or some provision would have to be made to keep the water warm in cold weather.

We are not able to give any data concerning their cost compared with those made of wood and of the same capacity.

equal in length to what is required for a passenger train of 12 cars. This is laid at a height of about six inches from the floor, and three air-brake cylinders are connected with the pipes. The air-pump is fastened against the wall, and is operated by steam, which is carried through a pipe from a locomotive in the round-house. The model is perfect in all points, and its workings can be illustrated as clearly as if the brakes were attached to a train. It is believed that by familiarizing the brakemen with the air-brake, many accidents, due to the ignorance of its workings, may be averted.

—*Buffalo Express.*

Gambling Conductors.

Another effort is being made by the Rock Island Railroad Company to eradicate gambling from the habits of their employees, and especially those upon whose diligence and reliability really depends the safety of the trains. A few days ago it was reported to Superintendent Chamberlain that three freight conductors, lodging in a caboose at Rock Island, were in the habit of spending their entire time when off duty, and supposed to be resting for their next run, in gambling. It is one of the rules of the company that the train employes shall absolutely abstain from drinking and gambling, and the violation of this rule by the above-mentioned freight conductors is considered especially reprehensible by the officials of the road in view of the fact that the offenders have converted the lodging place kindly afforded by the company into a gambling den. Mr. Chamberlain yesterday informed all three of the transgressors

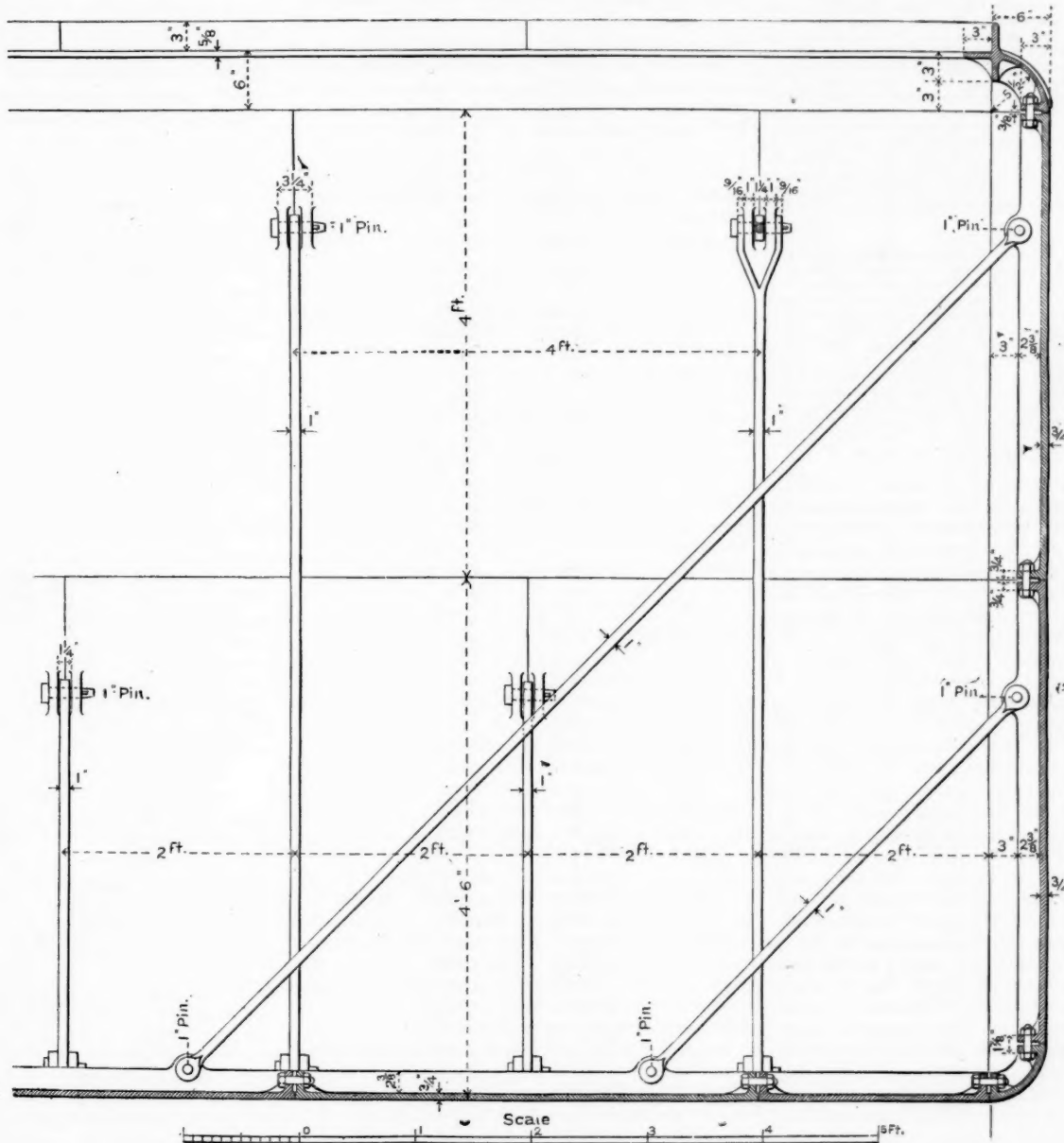


Fig. 4.

SECTION OF SIDE OF CAST-IRON WATER TANK.

London, Brighton & South Coast Railway.

The drawings represent the method of construction so clearly that very little explanation need be given. It should be said, though, that such tanks are used on nearly all the railroads of England, and that a description of an American tank, made in the form of an immense wooden tub, excited not a little derision among English railroad engineers. It will be seen from the engravings that the English tanks are made of cast-iron plates, usually about $\frac{3}{4}$ to $\frac{1}{2}$ in. thick and 4 ft. square. These have flanges all around their edges, as shown in section in fig. 4, by which the plates are bolted together. It will be seen that the width of the bearing surface of the one plate against the other is equal only to the thickness of the plates, and that there is a space about $\frac{3}{8}$ wide between the two flanges. In this space a "rust joint" is made with iron turnings and sal-ammoniac, and in this way the tank is made tight. The method of doing this is familiar to all practical mechanics, and consists in filling the space referred to with the iron turnings, and driving them in so as to make a tight joint. In some cases the edges of the

plates, but knowing the cost of the latter, an estimate could easily be made of the expense of the former.

Cast-iron tanks are in use among the manufactories of New England, but, so far as our information goes, have not been used on any American railroads.

THE SCRAP HEAP.

Joy's Locomotive Valve Gear.

We are informed that Joy's locomotive valve gear (illustrated on pages 18 and 19 of our present volume) is to be tried on the Pennsylvania Railroad. It will be applied to one of the Class K engines running fast passenger trains between New York and Philadelphia.

It is also to be tried on a fast passenger engine on the Boston, Hoosac Tunnel & Western road, and if successful will be applied to other engines on that road.

A School for Brakemen.

The Erie is fitting up one of the buildings of the new car shops, at Hornellsville, with an ingenious apparatus, with which the brakemen will be taught the management of the air-brake. The instruction is afforded by a set of air-pipes

that their services were no longer needed. One of the conductors called at Mr. Chamberlain's office yesterday afternoon, and appealed with tearful earnestness for leniency, and promised that if re-employed he would give no more cause for complaint. He denied that he and the other two men were gambling in the proper sense of the word. They simply played penny-ante to while away their lonesome hours, and none of them were out of much money at the end of the month. But Superintendent Chamberlain would not listen to the entreaties and excuses, claiming that instead of spending their time in playing penny-ante or any other kind of game they ought to take the much-needed rest, and prepare themselves to perform their duties faithfully the next day, as a man in charge of a train and upon whose vigilance depended not only the safety of the property under his charge, but also the lives of those on the trains of the company, should be in the best condition. He claimed to have positive evidence that one of the offenders had lost in one day's play his salary for the whole month, and he felt that he could not safely employ such men. Mr. Chamberlain declares that hereafter he will keep a sharp lookout that the rules of the company in regard to drinking and gambling are implicitly complied with, and anyone found violating these rules will be peremptorily discharged. —*Chicago Tribune.*



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men, practically acquainted with them, are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

PROGRESS IN AGRICULTURE.

The acreage of crops is for this country one of the most important of statistical facts. But attention seems to be given almost exclusively not to acreage but to production. The latter is certainly of the greatest immediate importance. On it, and not on acreage at all, depend the amount of traffic, prices and profits for the season after harvest. But as indicating the tendency of population and industry, acreage is much more important than production. It is of vital importance to most industries, especially so to carriers, and most of all to companies contemplating the construction of new railroads, to know whether and how fast and where agricultural industry is increasing. Taking a long series of years together this can be learned by examining statistics of production, for then the good years and the bad years balance each other; but if I have in mind the construction of a new railroad through a farming country, it is of comparatively little importance for me to know that the acreage in cultivation and the production have doubled since 1870; but of vast importance to know whether it is increasing now. Neither can we judge from the general condition of business and the greater or less rapid growth of population; for agriculture does not always grow at the same rate as other industries. In this country substantially all the other industries (except mining precious metals and petroleum production) depend upon agriculture; we export very little except gold, silver, petroleum and the products of the soil. As soon as other industries have developed sufficiently to supply the home demand, there is no more room for growth for them until there is an increase in the number of acres under cultivation, of the population engaged in agriculture, and of their production, which is not limited by the wants of the United States, but only by the wants of the world, and is not likely to be limited seriously so long as there is such an enormous area of uncultivated fertile land in this country.

Very little time is needed to bring the production of most manufactured goods up to the full consumption of the country. The cotton and woolen mills and iron works seem able to increase their production 25 per cent. every year if there is a market for their products, and the railroads can double their capacity in a very short time, and, for that matter, at comparatively small cost. But their growth must finally be limited to the growth of the one industry which has itself (so to speak) no limits.

We have often called attention to the fact that "good times" are not those most favorable to growth of agriculture, and have supported this view by the slower reported increase in grain production before than after 1873. During the period when railroad building was most active and all kinds of business

prosperous and profitable there was a smaller increase in grain production than afterwards.

It is true that we have very imperfect data to go on. The census of 1870 gave the production, but not the acreage of the crops; and the Agricultural Department reports, giving both acreage and production, go back only to 1870. Further, this department has to depend chiefly upon correspondents' estimates for ascertaining the yearly acreage and production of the different parts of the country, much as the newspapers do when they collect crop statistics about harvest time. It has, however, the advantage of all the work done by others, and can check its final estimates by the reports of crops marketed, which are quite exact. It should, too, after years of experience, be able to judge of individual reports and to revise them as no other authority can. How much statistical skill has been attained in the department we cannot judge, but there is no doubt that a terrible shock was given to confidence in its estimates by the discrepancy between these estimates and the results of census taken on every farm in 1880, and which is probably as complete and as accurate as it could be made.

There is, however, not much wonder that the differences between the census and the estimates should be great, and we shall try to show below that a comparatively small yearly error, always made on one side, will in the course of several years result in a tremendous difference between the estimated and the actual amount, and that without any serious misleading of the public using the statistics most.

The estimates of acreage, production, etc., are almost universally made by comparisons with the previous year, and not in acres or bushels, but in percentages. An observer familiar with the operations and purposes of the farmers in a given town or county, for instance, would be very unlikely to say that last fall there were so many acres of winter wheat sown, more or less than in the fall of 1880. What he would say would be that less (or more) was sown generally, probably 10 per cent. less, or as the case might be, only a considerable change attracting attention. The scores and hundreds of reports from one state being collected, the statistician has data to estimate (though very imperfectly) the result for the state—a decrease here, no change there, and an increase in another place—and concludes, we will say, that there is on an average an increase of 5 per cent. in the acreage of the state. Now, assuming that the census has afforded him a basis of true acreage to begin with, a slight under or over estimate will in a few years make a great difference. For instance, the acreage of corn in the United States in 1879 was estimated by the Agricultural Department to be 53,085,450. The statistician of this Department had charge of the agricultural statistics of the census of 1880, and then found, by enumerators inquiring on every farm, that the true corn area was 62,326,852 acres. Here was the enormous difference of 17.4 per cent. Yet, beginning accurately in 1869, it was only necessary that the increase in average acreage should be underestimated by a little more than 1½ per cent. a year in order to account for the whole of this difference—that the average yearly increase should have been estimated at 3.6 per cent. instead of 5.25 per cent. This error, applied to the crops of 1870, would amount only to 17,500,000 bushels in a total crop of 1,100,000,000—which is certainly as close as an estimate can be expected to be; and even in the crop of 1881 the error in the increase at this rate would be less than 30,000,000 bushels in a crop of 1,200,000,000. The trouble is that the error in total amount multiplies year by year until checked by a trustworthy report of the number of acres actually cultivated, such as the last census has supplied, and as is given in some of the states by assessors' reports.

While the comparatively small yearly error grows to enormous proportions in quantities in the course of eight or nine years, it misleads the public only to the extent of the error for the year itself, for the reason that all buying and selling, consumption and planting, are based, not on any absolute figures, but on the experience of the previous year. The Department estimated the corn production of 1879 230,000,000 bushels less than it actually was, but it estimated the average yield per acre with great accuracy—29.2 bushels per acre, against 28.4 as shown by the census. But its estimate was that the crop of 1879 was 159,700,000 greater than the crop of 1878, and this is what was practically regarded in estimating supply and demand. If its estimate of the increase then was no further out of the way than it was on the average from 1869 to 1879, then it was but 24,000,000 bushels too small, and this was the extent of the error by which the public was misled.

The error in wheat was comparatively small, and as this is the grain most bought and sold (corn and oats being mostly consumed at home), it is most important

that the crop of this grain should be correctly estimated.

If we correct the Department's estimates of acreage as indicated, in the light of the last census, assuming such an underestimate every year as would result in ten years in the difference between the estimate and the census return of acreage in 1879, we shall have the following as the acreage of cereal crops each year, beginning with 1870:

Year.	Acres.	Inc. or Dec. from previous years.	P.c.
1870.....	69,200,000		
1871.....	68,100,000	D. 1,100,000	4.4
1872.....	70,100,000	I. 2,000,000	5.7
1873.....	77,820,000	I. 7,720,000	11.0
1874.....	86,528,000	I. 8,708,000	11.2
1875.....	94,100,000	I. 7,572,000	8.7
1876.....	103,312,000	I. 9,212,000	9.8
1877.....	104,038,000	I. 728,000	0.7
1878.....	114,400,000	I. 10,362,000	10.0
1879.....	118,665,000	I. 4,265,000	3.7
1880.....	120,924,000	I. 2,261,000	1.9
1881.....	123,388,000	I. 2,462,000	2.0

The Department itself has corrected its estimates for 1880 and 1881 in the light of the last census, and as this has been done by the same authority that prepared the census statistics, we have not ventured to revise these by adding 1½ per cent. to the Department's estimates for these years. If we did so, however, the increase in acreage in these last two years would still be much below the average in earlier years.

The crops in 1877 were unusually large, but this was due chiefly to an unusually large yield per acre, especially of wheat, the acreage of this being less than in 1876. There was a good demand for this crop, and it was very profitable, and with the marketing of it began our heavy grain exports, and the revival of business which has resulted in the present great activity and general prosperity. The long depression in other industries had been forcing men, as it were, into farming. Such increases in acreage as are shown from 1873 to 1876—8½ to 11½ per cent. a year, while the increase in population was not more than 2½ per cent.—prove that sufficiently. The very unfavorable result of the crop of 1876, resulting in the year of greatest depression of general business, checked this tendency to increase the area cultivated; but the exceptional profits of the crops of 1877 stimulated production again and supplied means for extending it. But with the marketing of the crops of 1878 began the great revival in other industries and a demand for men for manufactures, building and railroad construction which could not be supplied by the increased immigration, nor without lessening the rate of extending agriculture. So in the last three years we see but a moderate increase in the area under cultivation; in this time it has not increased quite so fast as the increase in population.

This, it seems to us, is what was to be expected. Manufacturing industries, building, and the like, cannot increase at the rate of 20 or 25 per cent. a year (as many have since 1878) when the increase of population is 3 per cent., and leave labor enough for the extension of agriculture at the old rate. The immigration does not begin to supply the labor needed for the non-agricultural industries alone. Indeed, we venture to say that the immense immigration of the last two years has not supplied so much labor as has been absorbed in the construction of new railroads alone. The increase in production of late years, indeed, has been possible only by the fuller employment of the population, which has made possible a much larger average production per individual. But for that, there could have been no growth in farming industries, in which, however, there has not been any appreciable increase in production per individual. Farmers and farm hands are as fully employed in bad times as good, and if prices are low do not on that account supply less production, though they may change it from one crop to another.

These figures for acreage cover grain crops only, which with hay include all the important agriculture of the North. The other important crop is cotton. The Agricultural Department has not yet reported the average of that in 1881. But there was a very rapid increase in it from 1879 to 1880 and again from 1880 to 1881—more rapid than ever before since the war, doubtless. The whole cotton acreage in 1881, however, was probably not more than 16,500,000 acres—not one-seventh of the grain acreage. This crop, however, requires much more labor per acre than any grain crop. Still, the increase in acreage has been made wholly with only the natural increase in population, there being very little immigration into the South, and scarcely any of the immigrants being engaged in cotton cultivation. But heretofore the cultivation of cotton has been limited less by want of labor than by want of capital. One or two prosperous years enabled the planters to increase the area cultivated largely—more, doubtless, than they will be able to do hereafter, for now at least labor is lacking for any great extension of planting there.

If the restriction of the growth of agriculture indi-

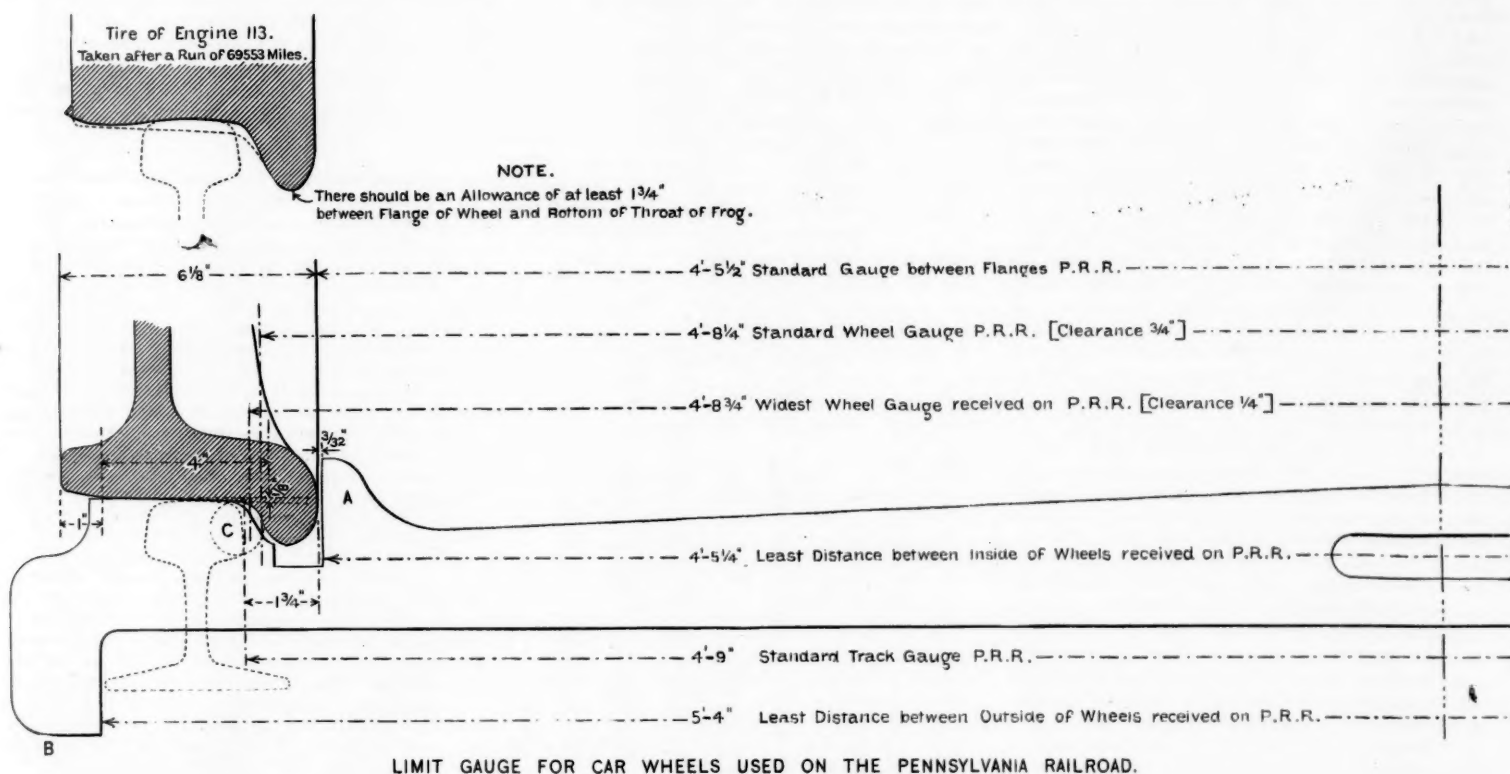
cated above is true, or nearly true, it is a fact of the utmost importance to the whole country and to all industries. There must soon be a great check to the growth of nearly all manufacturing industries, to building and to railroad construction, unless the agricultural industries on which they depend keep up with their growth, after the time has been reached when their production equals the demand. Mills cannot continue to make cloth for a million more farmers a year if only half a million more men go to farming each year. Some of the railroads built to share the traffic from a grain production increasing 250,000,000 bushels per year will fail of the expected support if the increase is only 50,000,000 bushels per year. If we exported coal, iron and manufactures on a large scale, then we might hope to have permanent growth and prosperity for them, even if agriculture ceased to grow, as it has ceased to grow rapidly in most European countries; that is, the demand of the world would determine for them what is now determined by the demand of the United States alone. This might be a worse condition than now exists, to be sure; but it would be a different one. What they are now depending upon is the agricultural industry of the United States. After they

up was the height of draw-bars. When trains were made up it was found that the draw-bars differed so much in height that it was both difficult and dangerous to couple the cars together. Among the earliest questions to which the Master Car-Builders' Association directed its attention was the establishment of a standard height for draw-bars. This was fixed at 2 ft. 9 in. from their centres to the top of the rails. This height has been very generally followed since, although by no means universally. The cars of many roads are not made to conform to it, probably through inadvertence or carelessness; and on others, as, for example, on the Pennsylvania Railroad, on which the height is 2 ft. 11 in., a different standard has been adopted.

In the construction of dead-blocks, or buffer-blocks, to which reference has been made a great many times in these columns, the diversity is still more marked. The Pennsylvania, the Erie, and most of the anthracite coal roads make their cars with two dead-blocks placed above and on each side of the draw-bar. The New York Central and most of the lines centering in Chicago make them with a single block above the draw-bar. That such diversity is very dangerous to those who couple the cars hardly need be pointed

at B—intended to go over the outside of the wheel treads. If the distance over the treads is less than that between the projections B (5 ft. 4 in.), the car is also rejected. We have not heard that a similar limit gauge is used on any of the standard-gauge lines; but obviously there is just as much reason to apprehend that the wheels of Pennsylvania Railroad cars will be gauged too wide for the former as there is for the officers of the Pennsylvania to fear that standard-gauge cars may be too narrow for their track. It is plain, though, that only very strict inspection can avoid danger from this source on roads of either gauge.

Discrepancies in the gauge of wheels, though, do not arise alone from the differences in the distance between the rails. Unfortunately, there is no uniformity in the form or dimensions of either the wheel flanges or the heads of rails. Nearly every engineer who controls the form of rails seems to seek distinction by designing one different from any used by anybody else. At a late monthly meeting of the Car-Builders' Association drawings showing the shape of the wheel flanges used by different manufacturers were submitted to the meeting. These showed that each of them followed his own



have increased their production so as to supply fully the wants of this country, they can hope to grow only as agriculture grows, and cannot grow fast unless it grows fast.

CAR CONSTRUCTION WITH REFERENCE TO INTERCHANGE.

It would have been difficult for the early projectors of railroads in this country to foresee the extent to which traffic is now interchanged, and even ten or twenty years ago railroad managers could not, or did not, realize that cars should be constructed to suit not only the roads to which they belong, but to run on any line between Maine and Mexico, or from Florida to British Columbia. This system of the interchange of traffic is likely to be developed, so that it will soon be possible to load a car at any railroad station in North America, and have it and its contents delivered at any other station. Whether it will be extended to the continent of South America, so that a car may be loaded at Behring Straits and delivered in Patagonia, may be left to the imaginations, and possibly to the realization, of the rising generation. The system has already effected very remarkable economic results, both here and in foreign countries, and is no doubt destined to influence, not only social, but political questions.

In view of the extent to which railroad companies have co-operated in perfecting what may be called the commercial regulations which have developed this system, it is a little remarkable that more intelligent attention has not been given to the adaptation of cars to this traffic. Each company has made its cars to suit itself, and, until a few years ago, without any reference to the construction of those belonging to other lines. The first important question which came

out. The two systems, though, have been adopted by about an equal number of roads, and probably each year about half the cars built are made one way, and the other half the other way. The evil is thus being perpetuated and the remedy therefore grows more difficult and hopeless with time.

It is to be regretted, too, that some years ago, when the interchange of cars was by no means so general as it is now, the gauge of the track of the Pennsylvania Railroad and its allied lines was fixed at 4 ft. 9 in. instead of 4 ft. 8 1/2 in., which is the standard gauge of the country. The consequence is that the cars built for the latter have 1/2 in. more end play between the flanges and the rails on the Pennsylvania Railroad than they have on the roads of standard gauge, and the Pennsylvania cars have a half inch less end play on foreign roads than they have on their own lines. A good deal of difficulty was experienced on the Pennsylvania road from the fact that cars were received from foreign roads with the wheels gauged so narrow that there was danger of the flanges spreading the track or of their mounting the rails. In some cases, too, wheels with narrow treads were liable to drop off the rails at short turn-outs, switches, etc. For this reason the Pennsylvania Railroad adopted what it calls a "limit gauge," an elevation of one half of which is represented by the engraving herewith. This is made to conform to the shape of the outside of the flange at c. If the flanges of the wheels of a car are further apart than the gauge it is rejected and not allowed to run on the Pennsylvania roads. The wheels, though, may be gauged too narrow for this line. Therefore the limit gauge has two projections, one of which is shown at A, intended to go between the flanges. If the latter are so near together as not to admit the limit gauge, the car is also rejected. There are other projections—one shown

particular fancy and was in no wise governed by any standard, or even attempted to conform to any system of uniformity.

Another difficulty is that there are no positive points on either the rails or flanges from which the gauge can be measured. It may be supposed that when wheels are allowed a given amount of end-play on the rails, that fact would establish precisely the distance the flanges should be apart. This would be so if the shape of the flanges conformed to that of the rail. This is rarely the case. It has been pointed out in these pages before that the radii of the curves, which form the upper corners of the rails vary all the way from 5/16 to 3/8 in., and that the curves which unite the flange to the tread of the wheels have radii varying from 1/16 to 1/8. The consequence is that when the shape of the wheels differs so much from that of the rails, there is no positive limit to the lateral motion of the wheels. Therefore the end-play of the wheels is not at all an exact quantity; and it has been found by those who have investigated the subject that very great differences exist in the wheel gauges used on different railroads. Absolute precision within certain limits, it is true, is not essential, but it is of very great importance that the variations should not exceed certain limits. When they do great danger is incurred.

A great deal has been said from time to time about the variation in the diameters of cast-iron wheels, and the importance of pairing them so that the two wheels on the same axle will be of the same size. The variation in their diameters has heretofore been attributed to the differences in the shrinkage of the metal of which they are made, which doubtless is not always exactly the same. It was, though, it is believed, a

revelation to most railroad men to learn, from the proceedings of the meeting already referred to, that hardly any of the manufacturers of wheels were using the same size of chill mould for a given size of wheels. In making 33-in. wheels, for example, some makers use a mould 33 in., others 33½, 33¾ and 34 in. in diameter. It is therefore not all surprising that the wheels made in different foundries are not uniform in this important dimension. No experiments, so far as we know, have ever been made to determine how great is the retarding effect of a given variation in the diameter of wheels, but there can be little doubt that it is very considerable. The wear of the wheels and the strain on the truck must also be very much increased by such differences.

Of the diversity in the patterns of those parts of cars which require most frequent renewal, a great deal has been said and written. Some idea of the extent of the evil may be formed from the remarks of Mr. Snow at the last monthly meeting of the Car-Builders' Association, to be published next week. There is almost or quite as much diversity in some other parts of cars. The saving, therefore, which, as Mr. Snow pointed out, could be effected if uniform brake-shoes were used, might be increased many fold, if uniformity was carried still further.

Of the danger to which trainmen are exposed a great deal has been said and written. That this danger may be very materially increased or diminished by the construction of cars there can be no doubt, and the mere fact that they differ much in their construction adds to the danger. The spaces between the ends of some cars is very great, and that of others little, so that in jumping from one to the other brakemen must each time measure the distance and be sure that they are not mistaken. The running-boards on the tops of some cars are wide, on others they are narrow; the brake wheels and levers in some cases are in one position, and on other cars in another. On some the hand-holds and steps are in quite a different place from that on which the men can expect to find them on others. All these circumstances add to the perplexity and uncertainty of those who are obliged to work about them.

There is no want of agreement about the evil of this diversity. The important question is, what means can be adopted to remedy it. The Master Car-Builders' Association has struggled with it for years, and has no doubt accomplished a great deal, considering the fact that it has neither authority nor money; but unless some closer relation can be established between the railroad companies and such an organization, it seems impossible to accomplish what needs so much to be done. Railroad companies must be directly represented, and must have the power to influence the deliberations of the Association and shape its action. It is not easy to bring such a result about. The first step to take, though, in accomplishing it is to make railroad managers see the need of it, which is the purpose of this article. This end once accomplished, it would not be difficult to find some way by which they could co-operate, and then the reform could probably be carried forward with little difficulty.

January Earnings.

January earnings are reported in our table for 63 railroads, a much larger number than ever before—having this year 46,373 miles of road, which is above 46 per cent. of all in operation in the United States, and 5,286 miles, or 13 per cent., more than the same companies were working in January of last year. In the aggregate these 63 roads earned this year \$23,104,525, which is \$3,893,129 and 20½ per cent. more than they earned in the corresponding month of last year, and their average earnings per mile increased from \$468 to \$498, or 6.4 per cent. This would be a large increase had the earnings last year been normal; but last year 47 roads reporting in our table showed a decrease of 7 per cent. in average earnings per mile, compared with 1880, and there was a decrease in these on 18 of these roads. The winter months last year for a very large number of Northern roads compared very unfavorably with those of the spring-like winter of the previous year; and for the same reason the earnings this year make a favorable showing compared with those of last.

Of the 63 roads reporting this year, only 15 show smaller total earnings than last year, and 21 smaller earnings per mile of road, and the decreases are usually small, the largest being 31 per cent. on the Mobile & Ohio, 20 on the Texas & Pacific, 20 on the Chicago, St. Louis & New Orleans, 17 on the Denver & Rio Grande, and 14 on the Iron Mountain. The increases are some of them very large, especially on lines whose traffic was interrupted by snow last year, as 33 per cent. on the Buffalo, Pittsburgh &

Western, 37 on the Burlington, Cedar Rapids & Northern, 33 on the Chicago, Milwaukee & St. Paul, 34½ on the Des Moines and Fort Dodge, 39 on the Detroit, Lansing & Northern, 23 on the Iowa lines of the Illinois Central, 34 on the Louisville, New Albany & Chicago, 49½ on the Milwaukee, Lake Shore & Western, 37 on the Minneapolis & St. Louis, and 26½ on the Manitoba. There are, however, several roads with large increases in earnings per mile which did not suffer from snow last year, as the Chesapeake & Ohio (27½ per cent. increase), the Missouri Pacific (25½), the Scioto Valley (28½), and the Union Pacific (32), besides three new roads, which were not fairly at work last winter.

This winter, it must be remembered, the traffic in January on trunk lines and in the Northwest was exceptionally large. The grain movement was larger than in any previous January. The roads carrying at trunk-line rates, however, that is, those from the Mississippi to the East, north of the Ohio and south of the lakes and the Rock Island road, had smaller gross earnings from this traffic than last year, and no net earnings at all, the rates being about one-third of those received last year. But this did not affect to any extent the roads carrying grain to Chicago and those west of the Mississippi. They had the heavy traffic and full rates at once, and for several of them it should have been an exceptionally profitable month, the traffic being heavier than in previous months, and also heavier than it has been since; for instance the receipts of grain and flour at Chicago and Milwaukee were much larger in January than in either December or November preceding, or February following. The speculation which made prices high at the Northwestern markets greatly stimulated traffic on the roads carrying grain to these markets, as did the prospect of an advance in rates to the seaboard.

The exceptional character of last winter gives unusual value to the following table of earnings per mile in January for six successive years:

	1877.	1878.	1879.	1880.	1881.	1882.
Ala. Gt. So.				\$191	\$202	\$209
Burl. C. R. & N.	\$314	\$380	\$270	374	297	408
Calro & St. L.	127	78	117	156	230	222
Central Iowa.	303	331	302	511	358	347
Central Pacific.	276	322	204	405	374	476
Chesapeake & O.	519	444	507	624	594	684
Chicago & Alton.	410	433	420	409	570	645
Chi. & E. Ill.	266	500	342	350	263	350
Chi. Mil. & St. P.	396	519	468	504	449	494
Chi. & N. W.	274	281	274	281	274	314
Chi. St. P. Minn. & Om.	515	534	486	522	558	604
Ch. Ham. & Dayton.	559	528	497	560	608	667
Cin., Ind., St. L. & Ch.	168	186	181	218	226	222
Cleve., Akron & Col.	161	197	371	558	463	463
Denver & Rio Grande.			224	351	474	
Des Moines & Ft. Dodge.			312	345	479	
D. L., Lansing & N.	627	617	582	704	778	
Eastern.	260		306	411	197	186
E. Tenn. Va. & Ga.			276	373	426	474
Flint & Pere Mar.	584	1,116	582	608	683	677
Great Western.	390	485	460	603	530	472
Hannibal & St. Jo.	521	597	557	535	557	633
Ill. Cen., in Ill.	232	341	290	316	298	367
Ill. Cen., in Iowa.	269	351	391	376	337	353
Ind. Bloom. & West.	351	261	314	363	391	373
Int. & Gt. N.	461	511	463	609	441	461
Lake Erie & West.	340	419	443	383	346	
Louisville & Nash.			224	272	274	305
Memphis & Charleston.	302	276	247	467	376	336
Minn. & St. L.	441	516	384	494	443	306
Mo., Kan. & Tex.	432	510	451	453	382	336
Mobile & Ohio.	402	397	402	397	400	345
Nash., Chat. & St. L.	259	333	257	397	385	339
N. Y. & New Eng.	900	785	813	1,026	1,185	1,250
Norfolk & Western.			60	127	161	247
Northern Central.			150	138	199	220
Northern Pacific.			1,342	1,424	1,649	1,752
Paducah & E'town.			113	214	267	
Peoria, Dec. & Evansville.			306	497	536	535
St. L., A. & T. H., Main			682	792	588	535
St. L. & San Fran.	316	296	241	387	359	389
St. L., Iron Mt. & So.	351	349	488	812	834	717
St. Paul, Minn. & Man.			275	343	435	
South Carolina.	388	414	413	509	438	484
Texas & Pacific.	479	462	419	522	351	280
Wabash, St. L. & Pac.	462	535	460	402	327	367

It should be noted that great additions of road have so changed the systems of the Wabash and the East Tennessee lines that the earnings per mile of the former this year can be fairly compared only with those of 1880 and 1881, and those of the latter only with its earnings last year. To a less extent this is true of many roads. For some it works favorably, as in the case of roads whose traffic two or three years ago had hardly begun to develop, and these can usually be distinguished by the fact that the earnings per mile were formerly a very small amount, and perhaps are far below the average still, as the Lake Erie & Western, the Minneapolis & St. Louis, the Northern Pacific, the Peoria, Decatur & Evansville, and the Manitoba road, all of which show large increases, and all but the last of which still have very light earnings per mile.

The two companies whose stocks have suffered most recently make a very good showing. The Louisville & Nashville has earnings per mile 4½ per cent. larger than last year, and smaller than in earlier years only because it has a much larger mileage of roads with light earnings now. The Denver & Rio Grande shows a considerable decrease in earnings per mile this year, it is true, but not only has it nearly doubled its mileage in the year, and that in a country where one may say

that no one lived two years ago, but it still has large earnings per mile—nearly as large as the average of the 63 roads reporting, though it is nearly all new road, and all in thinly peopled country, and is a line that has cost comparatively little. Its earnings per mile last January were a fourth larger than those of the Milwaukee & St. Paul, the Indiana, Bloomington & Western, the Long Island or the Wabash, and not much less than those of the Chicago & Northwestern or the Hannibal & St. Joseph. The decline in the stocks of these two roads has not been caused by the smallness of the reported earnings, in any degree, probably.

The number of roads reporting that have a considerable amount of trunk line through traffic is not large, and they show very small changes in earnings in comparison with last year—two small decreases and the others small increases, and of the aggregate increase on six such roads four-fifths was on the Pennsylvania Railroad.

February was more unfavorable than January last year, the 46 roads then reporting having a decrease of 10 per cent. in earnings per mile, compared with 1880. This year the month has been favorable as regards weather in most parts of the country, but several roads have had their traffic considerably interrupted by floods. Traffic was generally heavy till near the end of the month, but trunk-line rates were still unprofitable, though on the average higher than in January. March promises now to be a month of light traffic to many roads that have had a heavy winter business.

Pennsylvania Railroad Earnings and Expenses in January.

Unusual interest now attaches to all reports of working expenses, especially of roads east of the Mississippi, because there has been shown for some time a general increase in them, and if this were to continue or be maintained, it would make an immense difference in the profits of the roads. But at this time, when such reports are most interesting, we have fewer of them, which commonly happens when the results are less favorable than was hoped for or was generally expected. Unfortunately, in all this great territory there are but few roads that report expenses monthly. Among them, however, have been two of the trunk lines, which together carry probably more than half of the trunk-line traffic. Of these two the New York, Lake Erie & Western has ceased to publish monthly reports of either earnings or expenses since the expiration of its last fiscal year, Sept. 30, and now the Pennsylvania Railroad reports are the more important as they supply the chief key to the course of working expenses on roads carrying trunk-line traffic, and to some extent the general course of railroad expenses throughout the country.

We have been passing through a transition period during the last three years, from an era of light traffic and low prices to one of great activity in industry, heavy traffic and (comparatively) higher prices. In 1879, and partly in 1880, the railroads had the benefit of the heavy traffic while yet their expenses were increased comparatively little by the higher prices. Last year, however, and now, the increase in working expenses has become painfully evident. It has not, however, attracted so much attention as it deserves, for the reason that a large reduction of net earnings was expected in consequence of the railroad war, and the whole of the decrease, where there has been one, was likely to be charged to this cause, when more or less of it was due to the larger expenses.

Four weeks ago in commenting on the expenses of the Pennsylvania Railroad in 1881, we showed that, in spite of the terrible winter, its expenses were \$1,600,000 greater in the last than in the first half of the year. The following table of the gross and net earnings and expenses of the company on all lines east of Pittsburgh and Erie in the month of January shows how the movement continues:

January Earnings and Expenses, Pennsylvania Railroad, for Ten Years:			
Year.	Gross earnings.	Expenses.	Net earnings.
1873	\$2,754,284	\$2,194,652	\$559,632
1874	2,856,165	1,736,480	1,119,676
1875	2,290,339	1,630,767	659,572
1876	2,447,685	1,681,760	765,925
1877	2,383,599	1,656,044	727,555
1878	2,595,207	1,518,098	1,077,109
1879	2,543,424	1,323,893	1,219,531
1880	3,083,551	1,717,253	1,366,298
1881	3,189,215	1,982,354	1,206,861
1882	3,373,321	2,290,055	1,074,266

The growth of gross earnings continues. They were \$184,106 (5½ per cent.) more this year than last, and last year they were larger than ever before in January, though considerably smaller than for some months previous, which, however, is usual in January. The bad weather last year embarrassed this road less than the trunk lines further north, but it certainly increased its expenses materially; on the other hand it probably actually increased its traffic, because of the inability of the Northern lines to carry all that was offered them. At least the Pennsylvania brought to New York last winter a much larger proportion of the grain than it had done before for years. Rates were good then; this year on through traffic they were as bad as possible; and the increase in earnings on this road must have been in spite of a material decrease in the earnings from through business.

Coming to the working expenses we find this year an increase of no less than \$316,701, or 16 per cent., though the

weather was very favorable this year and very unfavorable last. This is a much larger increase than in any month last year, and is, indeed, one of the most unfavorable signs of the times that has appeared of late. The through traffic of the road was probably hardly as great this year as last. Receipts of grain at the three ports to which this road carries were much less this year, and so was the movement of provisions; the west-bound movement was probably larger, but on the whole, any considerable increase of train-mileage must have been due to growth of local traffic, which was very active both years, but doubtless larger this year, else there would have been a decrease and not an increase in gross earnings.

The result of this great increase in expenses is that the net earnings for the month are \$132,595 (11 per cent.) less than last year, \$292,032 (21½ per cent.) less than in 1881 and but \$54,735 greater than in 1879, when the gross earnings were \$829,897 less than this year, reduced, as now, by the low rates of a railroad war. The increase in expenses since 1879 is more than 50 per cent. The net earnings last January were smaller than in any month of 1881, and smaller than in any month of 1880 except May.

The course of earnings and expenses on this road of late may be followed in the following statement of them for each month since 1880:

	Gross earnings.	Expenses.	Net earnings.
1880.			
January.....	\$1,189,215	\$1,082,354	\$1,206,861
February.....	3,005,304	1,937,510	1,158,104
March.....	3,844,304	2,045,078	1,799,226
April.....	3,799,372	2,104,562	1,655,810
May.....	3,856,897	2,168,287	1,688,610
June.....	3,807,436	2,318,893	1,488,543
July.....	3,780,418	2,289,447	1,490,971
August.....	3,809,978	2,305,472	1,444,506
September.....	3,735,006	2,271,829	1,463,177
October.....	3,672,971	2,317,939	1,355,032
November.....	3,840,216	2,379,872	1,460,344
December.....	3,731,820	2,528,569	1,203,251
1882.			
January.....	3,373,321	2,209,055	1,074,266

January usually has larger earnings than February; but with that exception it is likely to be the worst month of the year. This year gross and net earnings were materially lessened in February by the extremely low through rates, which applied to substantially all the through traffic all the month. In February there should be a slight improvement in the earnings on the east-bound freight and a considerable one in the through passenger earnings; but the total through earnings until July will probably be much less than last year on this and all other trunk lines and their immediate western connections.

The western connections of the Pennsylvania Railroad include a very large number of roads under its own management, whose business should reflect pretty well the general condition of railroad business from Pennsylvania west to the Mississippi, and from the Ohio north to the lakes and the line of the Chicago, Rock Island & Pacific Railroad. The monthly report for these roads gives only the surplus of their net earnings over their fixed charges or the rentals paid for them; that is, the net result of their operations to the Pennsylvania Railroad Company. Last year in January this surplus was \$381,207; this year it was but \$9,741. The surplus, however, was unusually large in January last year. For the whole year 1881 it was \$2,799,141; for 1880, \$3,158,041, and for 1879, \$1,824,088—even then an average of \$152,000 per month, against \$9,741 last January. How much smaller receipts and how much larger expenses had to do with this great decrease in profits we have no means of knowing; the average monthly earnings of these lines were nearly \$2,500,000 and their expenses \$1,400,000 in 1880, and a decrease of 10 per cent. in their earnings, with an increase of 10 per cent. in their expenses, would make the decrease in profits. There was probably a considerable decrease in earnings on them, notwithstanding the increase in earnings on the Eastern Pennsylvania lines, but there was probably also a large increase in their expenses, which would be more significant than on the Eastern lines, because these roads probably suffered more from snow last year, and have had a smaller rather than a larger traffic this year.

Foreign Railroad Notes.

Dr. Moos, of Heidelberg, has continued his investigations of the effect of locomotive service on the sense of hearing. He has satisfied himself that it has a tendency (especially in mountainous districts) to reduce the sharpness of the sense considerably, but he has not data sufficient to judge what proportion become dangerously affected. Last year 160 persons on a Prussian railroad were examined, and there 21 per cent. were found hard of hearing, and the cases were most frequent and worst among those who had served longest. Another German physician says that no great requirements are made on the hearing capacity of trainmen, but that they are fully capable of performing their duties as long as they are able to understand ordinary conversation.

Still another German physician, Dr. Güterbock, examined 182 engine-men and firemen and found 20 per cent. of the former and 6½ per cent. of the latter with less than the normal hearing capacity. Of those who had served 15 to 19 years almost one-third, and of those who had served more than 20 years more than half were more or less hard of hearing. He, however, does not indorse Dr. Moos' view that the riding on the engine tends to produce deafness, but says it is caused chiefly by catarrhs to which engine-men are especially subject. He does not think that the infirmity makes the men unfit for their duties.

The management of a group of Hungarian roads has established a commission which is a sort of court martial to try employes for such breaches of discipline as are punished

by reduction in rank, suspension or dismissal. The commission consists of a chairman and four members, with four substitutes. Half of the members and substitutes are named by the management (in that case called the "Council of Administration") and the other half by a vote of the employes, a majority electing. The person to be tried is prosecuted, as it were, by representatives of the department to which he belongs, and there is also an "investigating commissioner," but these have only an advisory vote. The finding of the commission is laid before the Council of Administration, but the latter body can reject such finding only by a two-thirds vote. In certain cases (it is a state railroad), there is an appeal to the Minister who is in charge of the state railroads. It is thought that such a body, containing representatives of the class of employes to which the person accused belongs, will have full knowledge of the circumstances and motives that relate to the cases, and so be better able to do justice.

The City Railroad (elevated) in Berlin, built by the government and opened Feb. 7, has cost about \$16,000,000—\$2,300,000 per mile. It was projected (but not by the government) some ten years ago, when Berlin was growing with unexampled rapidity, and the crowding of the city and the rents paid for the poorest quarters were absolutely frightful, and when too there were practically no horse railroads. Now there are many street railroads, and the high rents caused such a furor of building that there are said to be 15,000 unrented dwellings in the city. The new road, however, is thought to have fair prospects of financial success. By building it the government avoided an expenditure of \$2,500,000 for a station for one of its roads, and it will be of very great value as a connection of existing railroads, used for bringing suburban trains from various lines into the heart of the city—something as if the suburban trains of the New Jersey roads entered New York over one of the elevated roads and stopped at all its stations.

Dr. Friedrich Gauster, Surgeon-in-Chief of the Crown Prince Rudolph Railroad of Austria, noting the recent discussions concerning deafness among railroad men, gives the results of his observations. He found a good many men hard of hearing, but more of them were road guards and switchmen than trainmen, and he attributed the cause to the catarrhs to which these men are especially subject. These roadmen, too, he says, are more likely than the engine-men to make mistakes because of deafness, and he thinks the danger is such as to justify frequent tests of employes for hearing.

At the end of 1880 there were in Austria 7,086 miles of railroad, of which 12½ per cent. were double-track roads. This was at the rate of one mile of road to 3,123 inhabitants and 16½ square miles of territory.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Oregon Railway & Navigation Co.—Track laid from Umatilla, Or., west 10 miles.

Richmond & Allegheny.—The *Henrico Branch* is completed from Lorraine, Va., north and east to Hungary station, 11 miles.

Rochester & Pittsburgh.—Extended from Salamanca, N. Y., southeast to Great Valley, 3 miles.

Venice & Carondelet.—Completed from Venice, Ill., southward to East Carondelet, 12 miles.

This is a total of 36 miles of new railroad, making 455 miles thus far reported for 1882, against 199 miles reported at the corresponding time last year, 497 miles in 1880, and 97 miles in 1879.

A NATIONAL RAILROAD COMMISSION was proposed by Mr. Charles Francis Adams, Jr., last week in a speech at a dinner given by the Boston Merchants' Association last Saturday. Mr. Adams had been invited to visit Washington and present his views for the second or third time before a Congressional committee deliberating over the Reagan bill. The speech repeats what Mr. Adams has said now for several years in reports, articles and speeches, but in a very striking and positive manner, which has attracted attention to it from the whole country. Mr. Adams wants an investigating commission—one that will collect facts and statistics, investigate complaints, and report to Congress what the matter is and what it thinks ought to be done about it; and he is positive that this is all the power that a railroad commission needs. The theory is that if such a body finds and reports remediable abuses, Congress will pass laws to remedy them; but Mr. Adams is confident that no legislation would be required. If a body of experts, commanding public confidence, having ascertained the facts, should openly condemn any practice of the railroads, they would mend their ways hastily, lest a worse fate befall them. There has been some disposition to ridicule the alleged "sensitiveness to public opinion" of railroad corporations. In the sense of feeling pain because of the ill opinion of their fellows, of course sensitiveness to public opinion can hardly be said to exist among corporations. Their sensitiveness is a lively sense of the probability or possibility of a reduction of their profits by legislation embodying hostile public opinion. There is much less to fear from public opinion and consequent legislation where there is no commission of experts; because without their mediation it is next to impossible to ascertain definitely the facts that give a foundation for a decided opinion, and still less possible to know whether proposed legislation would be effective, or would not be worse than the evil it proposed to remedy. When such a body says that it

has found such and such practices to exist, that the public suffers from them, and that they can be prevented by such and such legislation, the railroads will feel that the passage of the proposed laws is certain if the practices complained of are persisted in, and it is such "sensitiveness to public opinion" as this which they possess in a high degree, it being little more than the instinct of self preservation.

Mr. Adams made one statement in his speech which the public will be sorry to hear, namely, that he "has done all the commissioner work that he proposes to do in this world." Universally public opinion would name him as the fittest head for a national railroad commission. But he partly made up for this refusal to serve by nominating a commission of persons so ideally fit in character and general attainments for the work proposed as to lead one to wish that he might have an opportunity of exercising such excellent discretion in the appointment of other national officers as well as railroad commissioners, in the place occupied and honored by his grandfather and great grandfather. He would have a lawyer, a railroad manager and an economist and statistician in his board, and he names Judge Cooley for the lawyer, Robert Harris for the railroad man, and Francis A. Walker for the economist. It would be hard to improve upon those nominations. Such a commission, we may be sure, would be not only able and independent, but animated by the loftiest motives, and just to the uttermost.

THE NEW YORK, PENNSYLVANIA & OHIO RAILROAD, it has been rumored, is likely to pass under the control of Messrs. Wm. H. Vanderbilt and Franklin B. Gowen by their appointment as voting trustees. Such a movement seems extremely improbable, not that the road might not find advantage in a close alliance with the Vanderbilt roads and the Reading, but that this could be had in a much simpler and easier way than by changing the voting trustees—who, indeed, virtually cannot be changed without their own consent. There are four of these voting trustees, three named by the first-mortgage bondholders, and one by the second-mortgage and leased line bondholders; these trustees are to choose the directors until the third-mortgage bondholders have received 7 per cent. interest in cash for three successive years. As there is \$3,650,000 of interest to pay on bonds prior to the third-mortgage, and this is increasing yearly by the funding of unearned interest on the first-mortgage bonds, and the largest net income so far applicable to interest payments was little more than \$1,000,000, we can hardly expect the occupation of the voting trustees to be gone this century. They represent directly the persons who get the profits of the road (when it has any) and are supposed to be themselves bondholders. If they wish to put Mr. Vanderbilt and Mr. Gowen in charge, they can do so at any annual election, but about three months ago they chose Mr. Adams and a director intended to make a close alliance with the Erie, to which the New York, Pennsylvania & Ohio is now more valuable than ever before, because it is its only western rail connection from which it can obtain much traffic, and more valuable than it can be to any other road.

The rumor probably represents the wishes of Mr. James McHenry, who is supposed to own some millions of New York, Pennsylvania & Ohio stock, which has no voice in appointing voting trustees, and will have none in the management of the road until after the road's profits for three successive years have been five or six times as large as they ever have been. He bitterly opposes the alliance with the Erie, and the only alternative to an alliance with the Erie is one with the New York Central or a connection with the Reading.

The latter is not so absurd as many might think. Indeed it is not absurd at all, but was long ago contemplated and intended. The Jersey Shore, Pine Creek & Buffalo road, which is now under construction as the connection between the Reading and the New York Central, was originally designed to connect the Atlantic & Great Western with the Reading. The Reading connection is more valuable now than then, because now it gives a connection with New York as well as with the anthracite mines and Philadelphia. The New York, Pennsylvania & Ohio, however, cannot afford to give up its Erie connection as the Erie cannot very well do without the New York, Pennsylvania & Ohio. The Erie has an immense traffic to give in return for what its western connections may bring it, and under these circumstances it will always be able to find a connection.

CHICAGO SHIPMENTS EASTWARD during the week ending Feb. 18 were 57,602 tons, against 48,921 in the corresponding week of last year and 68,499 in the previous week this year. These shipments were the smallest since the first week of the year, but larger than the average last year in January and February. Of them the Chicago & Grand Trunk carried 11.8 per cent., the Michigan Central 30.9, the Lake Shore 19.7, the Fort Wayne 22.2, the Pan-handle 9.1, and the Baltimore & Ohio 6.3 per cent. The percentage by the Lake Shore is the smallest ever reported, we believe, but the two Vanderbilt roads together carried 50.6 per cent. of the whole, against 49 in the old pool, and the two Pennsylvania roads 31.3 per cent. of the whole, against 33 in the pool.

For three successive years the shipments in this week ending Feb. 18 have been:

	1880.	1881.	1882.
Tons.....	46,780	48,921	57,602

This year they were 18 per cent. more than last year and 23½ per cent. more than in 1880.

For the week ending Feb. 25 the Chicago Board of Trade reports the shipments billed from Chicago to have been only 39,691 tons, against 45,708 reported by it in the corresponding week of last year, and 51,831 in the preceding week of this year. These are the smallest shipments reported since June, but were indicated by the course of receipts and of the grain trade at Chicago. This year 7,976

tons of these receipts were flour, 34,440 grain, and 7,272 provisions. Nearly half (46 per cent.) of the flour went by the Michigan Central, and 38 per cent. of the grain. The two Vanderbilt roads together carried 60½ per cent. of the grain and flour, but only 40 per cent. of the provisions; the two Pennsylvania roads carried 21½ per cent. of the grain and flour and 50½ per cent. of the provisions.

The proposition to advance rates on east bound freight has been withdrawn, not because of any disagreement as to the propriety of an advance, but because it was found that the existing tariff was not strictly maintained, as it is not likely to be until there has been an apportionment of the traffic among the roads.

A SHIPMENT OF CALIFORNIA WHEAT TO ST. LOUIS is reported to have actually arrived at St. Louis by rail over the Southern Pacific and Atchison, Topeka & Santa Fe railroads, a part of a lot of 200,000 bushels contracted to be carried for 50 cents per bushel. The distance from San Francisco to St. Louis is 2,660 miles, and from the most southerly California wheat region the distance is about 200 miles less. The rate is equivalent to 88½ cents per 100 lbs., to \$16.67 per ton, and to 0.625 cent per ton per mile—equivalent to 8½ cents per 100 lbs. from Kansas City to St. Louis, where the rate is usually 15 cents when maintained. It seems strange indeed that wheat should come so far to St. Louis, there to meet the competition of the Mississippi valley wheat and to be carried 1,050 miles further by rail after being ground. It can hardly be worth more than \$1.20 to \$1.25 a bushel after reaching St. Louis, and recent quotations made the cost of shipping from San Francisco to Liverpool considerably less than 50 cents a bushel. The Liverpool price being as much as 20 to 25 cents a bushel higher than the St. Louis price, it is difficult to see why as much should be paid for carrying to St. Louis as to Liverpool. When the shipments were ordered, however, grain may have been 20 cents higher at St. Louis, and nearly as high as at Liverpool.

If shipments of wheat can be made to advantage from California to San Francisco, of course they can be made to New York and other Atlantic ports also, as the bulk of the grain shipments from St. Louis are now made by rail to the East. There has been nothing like this in the history of traffic before, however, and it deserves to be remembered that in 1882 wheat could be carried by rail 3,700 miles to a market where it brings \$1.35 a bushel or less. There is probably no other country in the world where the lowest rail rates charged on wheat would not make the cost of carrying such a distance as much as \$1 per bushel, which is just about one cent per ton per mile.

NORTHWESTERN GRAIN RECEIPTS have fallen off greatly, as we anticipated. They are now smaller than usual at this time of year, though for the first six weeks of the year they were very much larger. Our reports of flour and grain receipts at Chicago and Milwaukee in February (given under "Traffic and Earnings") shows that these fell off rapidly from week to week this year; in the first week of the month they were 3,237,441 bushels; in the last, 1,574,295. In the first week they were the largest or nearly the largest receipts ever had at these places in a winter week; in the last week they were much below the average of the last few years—less even than the average of the terribly stormy February of last year, which was 1,932,632 bushels. The cause we have sufficiently explained heretofore: the high prices prevailing until recently and the low rates to the seaboard tended to draw out an unusually large proportion of the farmers' surplus. The lower prices and higher rail rates and the reduction of stocks in farmers' hands naturally reduce receipts now. Having carried an unusually large amount in the first six weeks of the year, though there were unusually light crops, it was inevitable that there should be a light movement at some time thereafter.

The lighter traffic affects chiefly the profits of the Northwestern railroads. It is true that shipments over the lines to the East are greatly reduced also, but as they have not at any time made any profit on the grain carried by them this winter, this is not felt in their profits. Indeed, they might be getting as much now as they were in January, when they were carrying twice as much, if they received full rates; but we understand that the low tariff of Jan. 23 is not always maintained, and the average rate received is probably a trifle less than 20 cents per 100 lbs. from Chicago to New York.

A CALIFORNIA-GALVESTON RAIL WHEAT RATE has been established by the Southern Pacific Railroad Company, amounting, from all points in California to Galveston, to \$13 per ton of 2,000 lbs., equal to about 0.6 cent per ton per mile from San Francisco and Sacramento, and to 0.66 cent from the southern part of the San Joaquin wheat district—a very low rate in any part of the country, in proportion to distance about equal to 30 cents per 100 lbs. from Chicago to New York. The San Francisco Post calculates that this will make the cost of shipping grain from San Francisco to Liverpool \$17.06 per ton of 2,240 lbs., without allowing for Galveston port charges, while by sea the rates now are \$13.50 to \$15. Vessels, however, for a year past have most of the time got much higher rates than these, averaging probably \$18 per ton, though previously the vessel rate had often been less than \$10. It is not probable that a large grain export trade can be established at Galveston until its harbor is improved, but a moderate amount might be taken for filling cotton cargoes, at favorable rates. If the Southern Pacific does not succeed in getting a paying traffic, however, it will profit its and the Central Pacific's interests greatly if it succeeds in limiting the vessel rates.

RAILROAD EARNINGS IN JANUARY.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1882.	1881.	Inc.	Dec.	P. c.	1882.	1881.	Increase.	Decrease.	P. c.	1882.	1881.	Inc.	Dec.	P. c.
Ala. Gt. Southern	290	290				\$ 60,575	\$ 58,508	\$ 2,067		3.5	\$ 209	\$ 202	\$ 7		3.5
Buffalo, Pitts. & West.	170	170				53,084	59,832	13,252		33.1	312	334	78		33.1
Bur. Ced. Rap. & No.	620	146			9.9	252,823	167,749	85,074		50.6	408	207	111		37.1
Cairo & St. Louis	244	191	53		27.9	87,307	66,169	21,138		32.0	358	347	11		3.2
Central Iowa	2,861	2,590	270		10.4	1,602,907	1,602,907	273,003		17.0	650	619	37		6.0
Central Pacific	442	435	7		1.7	210,455	162,530	47,925		29.4	476	374	102		27.6
Ches. Ohio & S. W.	115	115				15,934	18,897		2,963	15.6	139	164	25		15.6
Chicago & Alton	847	840	7		0.8	579,447	489,120	90,327		16.1	684	594	90		15.2
Chi. & Eastern Ill.	232	220	12		5.5	149,588	125,456	24,132		19.2	645	570	75		13.2
Chi. & Gt. Trk.	335	335				115,549	102,373	13,176		12.9	345	306	39		12.9
Chi. Mil. & St. Paul	4,100	3,775	325		8.5	1,435,000	990,847	444,153		44.5	350	262	87		33.1
Chi. & Northwestern	3,280	2,700	520		18.8	1,620,336	1,240,667	379,669		30.6	494	449	45		10.1
Chi. St. L. & N. O.	572	572				272,600	340,220		67,620	19.9	477	595		118	19.9
Chi. St. P. & M. & O.	980	940	40		4.3	367,591	257,785	109,806		19.0	314	274	40		14.6
Cin. Ham. & Dayton	345	345				208,376	192,666	15,710		8.2	604	558	46		8.2
Cin. Ind. St. L. & Chi.	300	300				200,042	182,523	17,519		9.6	667	608	59		9.6
Cleve. Akron & Col.	144	144				32,022	32,519		497	1.5	222	226	4		1.5
Col. H. V. & Toledo	30	320				214,106	198,312	15,854		8.0	669	620	49		7.8
Denver & R. G.	1,062	551	511		92.9	491,014	307,474	183,540		60.1	463	351	112		31.9
Des Moines & Ft. Dge	84	84				108,207	29,503	78,704		34.8	474	351	123		34.8
Det. Lan. & No.	226	226				108,207	77,882	30,325		38.0	479	345	134		38.9
Eastern	284	282	2		0.7	221,000	198,583	22,417		11.3	778	704	74		10.5
East Tenn. Va. & Ga	900	900				167,642	177,580		9,938	5.8	186	197	11		5.8
Flint & Pere Mar.	350	318	32		10.1	108,037	135,379	30,658		24.7	474	426	48		11.3
Great Western	526	526				356,168	359,478		3,312	0.9	677	683	6		0.9
Hannibal & St. Jo.	292	292				138,284	154,401		16,117	10.5	472	536	64		13.5
Houston, E. & W. Tex	103	84	19		22.6	18,286	9,043	9,243		103.6	177	108	69		63.9
Ill. Cen. Ill. lines	918	918				380,730	511,453	60,277		13.5	633	557	76		13.5
Iowa lines	402	402				147,443	119,828	27,615		23.1	367	298	69		23.1
Ind. Bloom. & West.	555	555				195,824	185,650	10,174		5.5	353	337	16		5.5
Lake Erie & Western	388	388				129,066	105,179	23,887		22.7	334	272	62		22.7
Long Island	335	320	15		4.7	119,688	104,513	15,175		13.1	357	327	30		9.2
Louisville & Nash.	2,060	1,840	220		11.9	950,065	812,117	137,948		17.0	461	441	20		4.5
Louisv. N. A. & Chi.	290	290				72,511	54,136	18,375		34.0	250	187	63		34.0
Mem. & Charleston	292	292				101,115	111,842		10,727	9.6	346	383	37		9.6
Mil. L. S. & West.	280	250	30		12.0	65,293	39,677	25,616		67.2	233	156	77		49.4
Minn. & St. Louis	360	225	135		60.0	109,671	50,403	59,268		117.6	303	224	81		37.2
Mo. Pacific lines:															
Central Branch	363	300	63		21.0	65,074	60,657	4,417		7.2	179	202	23		11.7
Int. & Gt. Northern	775	623	152		24.4	211,932	181,444	30,488		16.8	273	291	18		6.2
Mo., Kan. & Tex.	1,190	880	310		35.2	400,165	330,510	69,655		21.1	330	376	46		10.6
Mo. Pac. line	795	690	105		15.2	552,677	388,681	163,994		42.2	707	563	144		25.7
St. L., I. M. & So.	720	685	35		1.9	516,370	370,958	145,412		39.5	717	834	117		14.0
Mobile & Ohio	1,110	800	310		38.8	313,785	281,176	32,609		10.5	280	351	71		25.1
Nash. & Ohio	578	506	72		4.3	161,432	224,346			34.8	306	443	137		30.9
Nash., Chatta. & St. L.	467	467				156,993	178,143		21,150	11.9	333	382	49		12.1
N. Y. & N. England	396	316	80		25.3	215,624	189,750	25,874		13.0	545	600	55		9.1
Norfolk & Western	428	428				153,847	164,917		11,070	6.7	359	385	26		6.7
Northern Central	326	326				407,368	386,156	21,212		5.2	1,250	1,185	65		5.2
Northern Pacific	972	729	250		34.7	239,800	116,508	123,292		105.8	247	161	86		53.4
Ohio Central	231	231				90,854	42,308	48,546		11.8	303	183	120		114.3
Ad. & E. town	185	185				38,007	42,402		3,735	8.8	209	229	20		8.8
Pennsylvania	1,225	1,890	65		1.9	3,373,321	3,189,215	184,106		5.8	1,752	1,687	65		3.8
Peo., Dec. & Evansv.	105	105			33.7	104,307	40,607	27,148		68.2	267	214	53		25.0
St. L., A. & T. H. M. L. E	121	121				64,680	104,577		270	0.2	535	536	1		0.2
Belleville Line	660	592	68		11.5	256,784	212,435	44,349		20.8	389	359	30		8.3
St. P., Minn. & Man.	910	740	170		23.0	395,490	254,187	141,273		55.6	435	343	92		26.8
Scioto Valley	128	100	28		28.0	34,208	20,761	13,445		64.6	267	208	59		28.4
South Carolina	242	242				117,214	103,113	14,101		10.5	484	438	46		10.5
Tol. Del. & Bur.	395	395			38.6	70,773	46,545	24,228		64.5	193	162	31		19.1
Union Pacific	3,000	3,300	300		10.9	1,961,088	1,339,709	621,280		46.5	535	406	129		31.8
Wab., St. L. & Pacific	3,350	2,480	870		35.1	1,229,965	811,617	418,348		51.5	367	327	40		12.2
Total, 63 roads	46,373	41,087	5,286		12.9	23,104,525	19,210,896	4,166,183	272,554	20.3	498	468	30		6.4
Total inc. or dec.			5,286					3,893,629					30		6.4

A National Railroad Commission.

The following address was delivered by Mr. Charles Francis Adams, Jr., before the Merchants' Association of Boston at its regular meeting on the evening of Feb. 25:

I don't think I can better begin the little I have to say this evening than by quoting a few words from an address made more than a quarter of a century ago, not by me or in this country, but by the most prominent railroad man of that day, and in England. This is the year 1857. A committee of Congress is now busy drafting what may well prove the basis of our national railroad legislation; and the matter which is most pressingly urged on the attention of the Legislature of New York is a bill to create a railroad commission. Now listen to what Robert Stephenson, the son of the man who made railroads possible, said as long ago as 1856 in regard to railroad legislation and commissions. In the light of his words it is marvelous to see how little progress on these subjects the legislative mind has since then made. Speaking on behalf of the railroad interests, Stephenson said:

"What we want is a tribunal upon these subjects competent to judge, and willing to devote its attention to railway subjects only. We do not impute to Parliament that it is dishonest, but we impute that it is incompetent. Neither its practical experience, nor its time, nor its system of procedure, are adapted for railway legislation. * * * What we ask is knowledge. 'Give us,' we say, 'a tribunal competent to form a sound opinion. Commit to that tribunal, with any restrictions you think necessary, the whole of the great questions appertaining to our system. Let it protect private interests apart from railways; delegate to it the power of enforcing such regulations and restrictions as may be thought needful, to secure the rights of private persons; or of the public; devolve on it the duty of consolidating, if possible, the railway laws, and of making such amendments therein as the public interests and the property now depending on the system may require; give it full delegated power over us in any way you please; all we ask is, that it shall be a tribunal that is impartial, and that it is thoroughly informed; and, if impartiality and intelligence are secured, we do not fear the result.'"

These words truly expressed the situation 25 years ago; and they truly express them now. In them lies the only possible solution of the railroad problem of which so much has been said. That problem, I assure you, business gentlemen, is not now, or at any future time, going to be solved by any patent, automatic, legislative attachment to be devised by some cunning lawmaker. From the day that Stephenson uttered the words I have just quoted, and from a time before he uttered them, down to this day, there never has a Congress or Legislature sat in which men did not come forward with a few simple laws which, once passed, they confidently asserted would settle this matter for good and all. I remember once meeting in Europe during the height of the granger agitation a Western gentleman, who for years had occupied a prominent place in Congress. Knowing that I had given some attention to these railroad questions and wishing probably, after the custom of politicians, to let me know that he had heard of me, this Solon made some inquiry as to the probable course of legislation. In reply I innocently referred to the problem as a difficult one. "Difficult!" said he, "why, I don't think I should have any trouble in drawing up an act in half an hour which would settle the whole thing." Mortal ignorance and mortal self-sufficiency combined, you see, couldn't go

any further; and yet for half a century Parliament and legislatures have been passing in rapid succession these little laws, each of which was going to settle the matter!

We shall have more of them yet. Only the other day it was very kindly suggested to me by Mr. Candler, the member of Congress so well known to all the members of this association, that I should appear before the Committee of Commerce and give them my views on this subject; and since then the Committee itself, through its Chairman, has made the invitation a formal one. I did not accept it. My engagements were such that I could not. Even if I could have accepted it, however, I may as well confess that I should have gone on to Washington with small hope that any honest bill I could submit—and I mean any bill in which I believed and had faith—I should, I say, have gone on with small hope that such a bill would have any chance of adoption. It would be charged against it that it was too ridiculously simple; that it didn't amount to anything; that, if the Committee reported anything, the country expected it to report something stronger, and more complicated, and harder on the railroads. And so, unless the present Committee of Commerce is a most unusual one, its members would have turned to the granger models—those fine, old, automatic legal attachments to the railroad system, as I have called them—which never have accomplished anything of value, and never will.

Now, gentlemen, it is because I did not go to Washington to appear before the Committee of Commerce that I am here this evening before you. I have a little measure of my own to propose—a very little one; though it has cost me a good many years to prepare it. It occurred to me, however, that, after all, it did not much matter that I was not able to submit this pet measure of mine to the committee, seeing that I could, with the saving of a good deal of trouble to myself, come in here and comfortably submit it to you. Brought forward in this way it will probably command a good deal more public attention than it would if brought forward in the other; and it will stand, I imagine, quite as good a chance of adoption. My measure is based on Robert Stephenson's recommendation of 25 years ago, and it at least has the merit of being short and simple. It consists of four sections and four only; and it is, I believe, unique in railroad legislation. I will read it to you:

"Section 1. A Board of Commissioners of Interstate Commerce is hereby established as a bureau of the Interior Department, to consist of three commissioners, who shall be appointed by the President as soon as may be after the passage of this act. Said commissioners shall receive a salary of \$10,000 a year each, and shall hold their offices for five years from the first day of — succeeding the passage of this act.

forwarding the complaint upon which it is founded; shall be made on the spot where such cause of complaint originated, or wherever else it may be found most convenient. Said board of commissioners in any investigation conducted by them shall have power to summon witnesses and to direct the production of books, papers and contracts relating to any subject matter of complaint.

"Section 4. Said board shall in all ways endeavor to procure the data necessary to a gradual enactment of an intelligent system of national legislation regulating interstate railroad commerce, and shall make an annual report of their doings to the Secretary of the Interior on or before the 1st day of November of each year. Whenever an investigation is made on any complaint, a special report of such investigation, and the findings of the board thereon, shall also be made and forwarded to the parties making the complaint; and whenever it shall appear that any railroad corporation or other organization of persons engaged in commerce between the states has violated or failed to perform his or its duties, or that any change is necessary or expedient in the manner in which said commerce is carried on by said common carriers, in order to promote the public interest, the said commissioners shall give public notice thereof to all parties concerned, and shall include such notice in their next annual report, together with specific recommendations of legislation necessary to make the same effective."

This would be the measure that I should propose. A very short and simple measure, as you see, based on the familiar principle that the longest way round is often the shortest way home. In the present case I am very sure the way I have pointed out, long as it may seem, will prove not only the shortest way home, but the only way there. It is wearisome, I know, this being obliged to seriously study a problem before undertaking to solve it. It would be a great deal pleasanter to settle the whole thing by some such intuitive flash of legislative genius as that suggested by my Solon in Europe. Unfortunately it can't be done. As Mr. Lincoln said of the rebellion: "This is a big thing;" and if the government means to get the better of the railroad question, it will have to go to work upon it, as it at last did on the rebellion, in a big way. Legislative intuition and legislative jerks will only in the end make more delay.

So far, then, what I propose is almost painfully simple. I would begin with the beginning. I would patiently study cause before I would try to deal with effects. I would have Congress understand the disease before it prescribes a remedy. This, I know, isn't the usual course. For suggesting it even, I suppose I shall be accused of timidity and subservience to the corporations by more than one child of Hercules, who, wrapped snug in his legislative cradle, takes joy in the strangling of serpents before an admiring constituency. I have been so accused before; nevertheless, I still cling to the simple faith that, even in legislation, it's a good thing before making laws to know what you are making laws about.

It is, however, necessary to bear in mind that Robert Stephenson in recommending a special tribunal to deal with these subjects—a board of railroad commissioners as we should call it—did not stop there. He added certain quite important qualifications. It was to be a "tribunal competent to form a sound opinion"—a tribunal that is impartial and thoroughly informed." Here, after all, is the essential point. A railroad commission in itself amounts to nothing at all—it all depends on the men who are in the commission. They must not only be honest and wholly above suspicion, if they are going to accomplish anything, but they must understand their business. They must know perfectly well both what they want and how they mean to go to work to get it. On this subject I feel at liberty to speak as a disinterested party. Whether well or ill, I have done all the commissioner work I propose to do in this world, and I can't imagine, as at present advised, anything which would induce me to serve as a member of such a national tribunal as I suggest. It is true I haven't been asked to serve; but, as I don't want to be asked, I can speak freely of the qualifications those should possess who are asked. I say, then, that they are varied qualifications, and qualifications, too, of a very high order. In the first place one member of the board must possess a thorough knowledge of constitutional and other law, and be qualified to draft the most difficult statutes. As a rule railroad laws are models of clumsy drafting. The chances are always large that any railroad lawyer—and the corporations have all the best lawyers—can drive a locomotive through them. The statutes, therefore, which your commission recommends must be carefully drawn, with a thorough knowledge of the law. So much for that. In the next place, some other member of your board must be a railroad specialist—a practical man fully informed as to the way in which railroad work is done. This may seem to you a thing easily acquired. I can only say I have not found it so. It is now 15 years that I have been working over questions connected with railroads and their traffic—first in the service of the government, and more lately in that of the corporations. I can only say that even now I never take up a new question without finding strange and unfamiliar bearings to it which tax all the patience and intelligence at my command to master. A trained railroad man, I argue, therefore, as essential to your tribunal. The third man must complete the board; and he, too, must be a specialist. It is, however, a specialist of a peculiar kind which is wanted now—one trained to trace cause and effect, to handle statistics, to be sure that the remedy proposed will reach the evil complained of. He must supply the theory and the political economy of the board, as the others do the law and the practical knowledge.

A commission made up of such men as these would, I will guarantee, soon put the railroad problem in the way of solution. They would do it by the actual investigation of causes of complaint as your business men presented them. They would go to the spot, and listen to you and to the corporation, and sift the thing out. Then at last we should get at the facts and the conditions; and when we get at them we can hope to legislate successfully; and not until then.

But, perhaps, you will say: "Where are three such men as you describe to be found? They are not met with every day. You are talking of a tribunal of the highest order." This again is true. The questions with which the tribunal will have to deal are questions of the most far-reaching importance, and of a magnitude second to no others. The men to deal with them must be chosen accordingly. If not so chosen the thing will fail. The selection of your board, therefore, is the question. Very well; I will select a board. And first on the lawyer. I have never met him, and speak from no personal knowledge, but, judging by his reputation and writings, I should say that Judge Cooley, of Michigan, was well qualified to be the legal member, and at the head of the commission. The same could unquestionably be said of either of Judge Cooley's associates on the present advisory commission; but, as only one can be taken, I should select him for the reason that he has had least to do with politics, if for nothing else. His appointment would command universal respect, and that is a great deal. Among practical railroad men I could suggest several for the second place. One immediately occurs to me as peculiarly qualified. I refer to Robert Harris, formerly President of the Chicago, Burlington & Quincy road, and now General Manager of the Erie. Mr. Harris enjoys a character for honesty and directness among railroad men which would go far to secure

their confidence to any board of which he was a member. Last, and in my judgment the most important of all, would come the statistician; the economist, the careful student of cause and effect—the man to ascertain the real why and wherefore. For that position on the board I would select Francis A. Walker, the recent chief of the Census Bureau. There, then, is such a tribunal as Robert Stephenson, on behalf of the railroads, pleaded for twenty-five years ago—a tribunal "impartial" and "thoroughly informed"—one "competent to form a sound opinion;" for, now, as then, "what we ask is knowledge."

Given a commission such as I have suggested, and the so-called railroad problem would present few difficulties. It would either be understood and regulated, or, what I consider much more probable, it would be understood and largely let alone. This you will probably all agree to. Why, then, when you talk of a national railroad commission, do you not talk of one made up of men like these? Such men can be had if the government really wants them. Composed of such men, the commission would be of the greatest public service and a credit to the country. Men like these, I assure you—and I am now talking of what I know—wielding the great force of publicity and letting light into dark places, with Congress behind them, would call for few of those stringent laws which the average legislature loves so to pass. If, however, your commission is to be made up, not of men like them, but of men with "claims on the party," or any of that kind of cattle, then it would be a nuisance and a disgrace, and the end would be worse than the beginning. The regular, conventional, iron-clad railroad bill, bristling all over with injunctions and inhibitions and penalties, poor as it is and contemptible as it is, is better than that; for it is at least harmless.

After all, therefore, with the railroad commission it is as it is with the army and the navy and the bench—it is a mere question of the selection of men. In itself the commission is nothing but one more piece of government machinery. As such, you may rely upon it, it won't of itself do the work you want to have done. It can't be wound up and set in motion like an eight-day clock. It can't be set up and worked by any "pretence hand, as you would set up a steam engine and run it. On the contrary, its whole utility depends on the skill, the knowledge and the character of those put inside of it.

Webb's Compound Locomotive.

This locomotive, of which a brief notice was published in our issue of Nov. 4 of last year, is described as follows in a late number of *The Engineer*:

To Mr. Webb, Locomotive Superintendent of the London & Northwestern Railway, is due the credit of being the first English engineer who has in recent years produced a startling novelty in locomotive engines. In France, Belgium and Austria remarkable specimens of locomotive construction are turned out every now and then; and America has recently come to the front with the Fontaine locomotive. But in England we have preferred to follow the even tenor of our way, simplifying details, adopting better methods of putting work together, and rendering engines more substantial and more serviceable, refraining from making excursions into unknown regions of invention; and it can hardly be disputed that the result of this policy has been on the whole satisfactory. This, however, is no reason why departures should not be made now and then from the beaten path of locomotive construction, and to condemn Mr. Webb's design hastily or without due thought would be rather worse than foolish. For the present Mr. Webb is reticent about the engine and naturally so. It will be time enough to bring it prominently before the world when it has done some work. It will then form the subject, no doubt, of a paper to be read before the Institution of Mechanical Engineers. Meanwhile, we can at least satisfy the curiosity of our readers concerning its prominent peculiarities, though we can do little more.

The new engine has been constructed at Crewe, and is similar as regards boiler, wheels and so on, to the four coupled express engines of the London & Northwestern Railway, with which all English engineers, at least, are tolerably familiar. The trailing drivers are driven by a pair of outside cylinders, 11½ in. diameter and 24 in. stroke, secured to the side frames at a point just in advance of the leading driving-wheels. The piston-rod heads are guided by two flat bars, one at each side, instead of four, as usually employed, the cross-head being channeled to slide on the bars. The side valves are worked by Joy's patent gear, and the connecting rods lay hold of pins in the wheel bosses. So far we have a complete engine with outside cylinders and a pair of driving-wheels behind the fire-box, the whole closely resembling Crampton's patent engines, of happy memory. In the smoke-box, right beneath the funnel, is fixed a third cylinder, 26 in. diameter and 24 in. stroke, the connecting rod of which lays hold of the pin of a single crank in the middle of the length of the leading driving axle. The exhaust steam from the two small cylinders passes into a kind of gridiron of pipes between the engine frames, which pipes act as an intermediate receiver, and from thence it is led into a copper pipe coiled in the smoke-box, in order that it may be reheated and dried. Thence it goes into the valve-chest of the large cylinder. We have thus a locomotive with a single pair of driving-wheels in advance of the fire-box, driven by a single cylinder. It must be understood that the Crampton engine and this single-cylinder engine are quite independent of each other—that is to say, each may run at any pace it can. There are no coupling rods, nor is there anything to maintain a fixed relative position between the cranks of the single and double-cylinder engines, save the rails. The single engine depends for its supply of steam on the double-cylinder engine, and, should the latter slip, more steam is sent into the receiver than the large cylinder will take, and the back pressure rises, and so tends to check slipping; while for the same reason the pressure on the large piston is augmented, and it may slip its wheels. If, on the contrary, the single engine slips first, it will take more steam away than the other engines can supply, and its own pressure will fall off while the effective pressure in the other cylinders will be augmented. It is found that this controlling action operates very effectually, each engine doing its own share of the work fairly. No inconvenience results from the changing position relations of the crank-pin, the size of the intermediate receiver being sufficient to prevent irregularities in the amount of back pressure of much moment. With a boiler pressure of 120 lbs. the pressure in the receiver averages about 50 lbs. Such, then, briefly stated, is Mr. Webb's compound locomotive. It is a handsome engine, and has been run at very high speeds with perfect steadiness.

Mr. Webb has not, we need hardly say, adopted so abnormal a design for a whim. On the contrary, he expects to derive important advantages from this system of construction; and it is not too much to say that of the many compound locomotives which have been proposed and patented this is immeasurably the best. He claims, in the first place, that he gets all the advantages of a coupled engine without its disadvantages. Now, practically, the advantages and disadvantages of coupled and uncoupled engines resolve

themselves into a question of coal bills. Mr. Stirling has stated that a coupled engine will burn from 1 lb. to 2½ lbs. of coal more per mile than an uncoupled engine; but other locomotive superintendents say that on the whole the advantage is with the coupled engines, because they do not slip, and nothing wastes fuel more than slipping, which tears a fire to pieces, besides throwing away steam. In lieu of two coupling-rods, with such frictional resistance as they set up, Mr. Webb gets an extra complete engine. It can hardly be possible that the frictional resistances of all kinds caused by coupling an engine can be as great as the resistance of a piston, valve gear, cross-head and connecting rod. Secondly, Mr. Webb claims that by working his steam through two engines in succession, he will get great economy of fuel. On this point also there is much room for doubt. The first cost of the locomotive is, of course, in excess of that of a locomotive of the same power of the ordinary type; and there are three engines to be kept in repair and lubricated instead of two. These points must not be overlooked. Now, the objections to sending an engine into the shops for repairs are so great that all locomotive superintendents are straining every nerve to get the largest possible mileage out of their stock; so there is reason to conclude that there must be not only a saving in fuel, but a very substantial saving effected by Mr. Webb's engine, before it can be regarded as a success. The locomotive has already done a good deal of hard work in, we understand, a most satisfactory manner, and, so far as can be ascertained, there is reason to anticipate that a saving of fuel will be effected; how great no one at present knows. Mr. Webb is very well satisfied with the results he has obtained so far. The experiment will be watched with interest by railway engineers all over the world, and we wish Mr. Webb that success which his skill and inventive talent deserve.

Transportation in Congress.

In the House on the 28th:

The bill to authorize the construction of a bridge over the Mississippi at Keithsburg, Ill., was passed.

Mr. Robinson, of New York, introduced (by request) an extraordinary bill to organize the National Labor League Railway Company of America for the purpose of constructing, operating and maintaining a railway from the Atlantic seaboard to Chicago, St. Louis and Council Bluffs. It provides that for the purpose of establishing equal rights in the commerce among the states and for the purpose of securing a railway highway under such civil control as to prevent combinations against the public good, certain gentlemen shall be appointed a commission under the name of the National Board of Interstate Transportation. In the list of names appear the following: Francis B. Thurber, Thomas Kinsella, A. B. Mullett, J. B. Ecclesine, J. Pope Hodnett, Nicholas Muller and William H. Grace, who, with their colleagues, are authorized to carry out the purposes of this act by determining upon the terminal points of the railroad to be constructed, and to issue capital stock to the extent of \$40,000,000. It further provides that when the road shall have been constructed to Council Bluffs it may be continued to San Francisco, and in aid of its construction grants to it every alternate section of the unoccupied public lands through which it may pass for 50 miles on each side of the track. In order to relieve the wants of labor "depressed by a contraction of the currency," the workmen employed in building the railroad shall be paid by the government \$1 a day and the remainder of their wages in certificates of indebtedness redeemable in 3.65 bonds. The bill was referred.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Knox & Lincoln, annual meeting, at Damariscotta, Me., March 8.
Chicago & Grand Trunk, annual meeting, in Chicago, March 8.

Railroad Conventions.

The National Association of General Passenger & Ticket Agents will hold its annual meeting in New York, at the rooms of the Railway Club, No. 46 Bond street, beginning on Tuesday, March 21, at 11 a. m. Blank credentials will be furnished new members at the meeting.

Dividends.

Dividends have been declared as follows:
Boston & Albany, 2 per cent., quarterly, payable March 31 to stockholders of record Feb. 28.
St. Paul & Duluth, 1½ per cent., on the preferred stock, payable March 17. Transfer books close March 1.

Joint Executive Committee.

At the meeting begun March 1 Mr. Fink made an address, the material part of which was nearly as follows:

The Trunk Line Executive Committee, which acts also as your Standing Committee, suggests to you the consideration of the following measures for the removal of the difficulties which are referred to more particularly in my report to the Committee at the meeting of Aug. 10, 1881:

First.—That a division of traffic, both of dead freight and live stock, shall be made and carried out from the principal cities of the West—Chicago, St. Louis, Peoria, Indianapolis, Cincinnati, Toledo, Detroit, Cleveland, and all other cities where such a division may be practicable and desirable, and that this division shall not only be made between the terminal lines of the railroads, but it shall extend to the termini of the trunk lines.

Second.—That, in order to carry out this division, a similar plan to that adopted by the trunk lines, of making money settlements, is recommended.

Third.—That arrangements should be made by which rates are to be fully maintained from all points, whether there is a division of traffic or not; and for that purpose that each of the general freight agents of the roads upon which the traffic originates shall be held responsible for the strict maintenance of rates which may be established by the Executive Committee, so that in case rates are not maintained the responsibility can be fixed positively upon the General Freight Agent of the company, on whose line of road the freight originates.

Fourth.—That all authority to vary rates or to meet reduced rates of competing lines shall be absolutely withdrawn from the line and soliciting agents. It shall be the duty of these agents to report any violation of agreement by the competing lines to the general freight agents of the roads over which the line is operated, and the general freight agents shall report to the Chairman of the Executive Committee, who shall take action under the agreement of March

11, 1881, with the advice of the Trunk Line Executive Committee, as provided in said agreement.

Fifth.—That at all points where traffic is divided a joint agent shall be employed who shall be under the immediate direction of the general freight agents of the terminal lines, acting jointly, and who shall alone be authorized to issue bills of lading in the name of the line over which the freight is to be shipped at full tariff rates, corresponding with the rates at which the freight is waybilled.

Sixth.—That line agents and soliciting agents at points where a division of traffic is made shall be placed under the full control of the joint agent, who is to direct them as to the line over which they are to solicit or not solicit business, in order to assist in the equalization of balances as agreed upon in the division.

Seventh.—That all foreign freight agents of the trunk lines shall be prohibited from making any contracts on export freight, except through the General Freight Agent of the terminal line. A record shall be kept in the office of the Chairman of all the foreign freight contracts under through bills of lading, showing the inland and the ocean rates, and the total charges made to the shipper from point of origin to destination; and for that purpose daily reports of all contracts on export traffic shall be made to the Chairman.

Eighth.—On traffic originating on roads not members of the Committee, the Committee roads carrying the traffic shall be held responsible for the maintenance of rates, and shall charge full proportions of the through rate. And Committee roads shall refuse traffic on which full rates are not charged.

Ninth.—No rebate vouchers on through freight shall be paid until they have been examined and approved by the Chairman of the Joint Executive Committee.

Tenth.—No time contracts shall be made under any circumstances, and freight carried under existing contracts after March 1 (or such date as may be agreed upon) shall be reported and accounted for at full rates, in any division that may be made, so that the whole loss in revenue may fall on the lines which make the contracts.

Eleventh.—That differences as to the establishment and maintenance of rates shall be settled by arbitration, and that a permanent Board of Arbitration be appointed.

Twelfth.—That a division of passenger traffic shall be made with the view of securing a fair share of this traffic to the connecting roads of the trunk lines, and to reduce the expenses of conducting this traffic, and also to prevent hereafter the payment of commissions to agents without benefit to the railroads, and that this division of passenger traffic should be made substantially on the plan adopted by the trunk lines and in connection with them.

Propositions 1, 2, 3, 4, 8, 9, 10 and 11 were adopted by vote, and the other sections referred to committees.

There were representatives present from 21 roads in the Committee, including all the roads whose action is now important except the Grand Trunk, which was represented by Mr. Fink.

The division of traffic at each important Western city was referred to a committee for each place, which was to report Thursday if possible.

It is not probable that the work of the Committee will be completed before the end of the week.

ELECTIONS AND APPOINTMENTS.

Buffalo, New York & Philadelphia.—Mr. Henry Van Sickle has been appointed Train Master.

Mr. Henry Wagner has been appointed Master Mechanic in charge of the Buffalo shops in place of Allen Vail, promoted to be Superintendent of Motive Power and Machinery.

Camden & Atlantic.—At the annual meeting in Camden, N. J., Feb. 23, the following directors were chosen: Charles D. Freeman, James B. Dayton, Enoch A. Doughty, Thomas H. Dudley, Samuel C. Cooper, Joshua R. Jones, Edmund E. Read, John K. Hay, J. Lowndes Newbold, M. J. Mitcheson, Franklin Evans, William Worrell, William T. Ladner, Messrs. Newbold, Mitcheson, Evans, Worrell and Ladner are new directors. There were three tickets voted on, and considerable excitement over the result.

Chesapeake, Ohio & Southwestern.—Mr. H. S. Heywood has been appointed Road-Master of the Western Division, with headquarters at Paducah, Ky.

Chicago, Burlington & Kansas City.—Mr. W. E. Forker has been appointed Train-Master, with office in Keokuk, Ia., in place of T. B. Warden, resigned. Mr. Forker has been a passenger conductor for a number of years.

Chicago & Western Indiana.—Mr. George S. Griscom has been chosen General Manager and will soon take charge of the road. He was formerly Superintendent of the Eastern Division of the Pittsburgh, Ft. Wayne & Chicago, but has recently been connected with the Pittsburgh, Chartiers & Youghiogheny road.

Cleveland, Columbus, Cincinnati & Indianapolis.—Mr. W. J. Nichols is appointed Passenger Agent of the Central District with headquarters at Indianapolis, Ind., vice A. J. Halford, resigned.

Cleveland, Tuscarawas Valley & Wheeling.—The United States Circuit Court has appointed Oscar Townsend (General Manager of the road) Receiver, in a suit for foreclosure of mortgage. Mr. Townsend has reappointed the old officers of the road.

Cooperstown & Susquehanna Valley.—The board has elected Andrew Shaw President; E. M. Harris, Vice-President; B. M. Cody, Secretary and Treasurer.

Cornwall & Lebanon.—The officers of this new company are: President, Robert H. Coleman; directors, J. Taylor Boyd, Charles B. Forney, B. F. Hean, A. Hess, Hugh M. Maxwell, John Melly, George D. Rise, Grant Weidman; Secretary and Treasurer, George D. Rise.

Florida Central.—Mr. W. M. Davidson has been appointed General Manager in place of C. H. Allen, resigned.

Jacksonville, Pensacola & Mobile.—Mr. W. M. Davidson has been appointed General Manager in place of C. H. Allen, resigned. Mr. Davidson was formerly connected with the road.

Louisville, Charleston & Peoria.—The directors of this new company are: Louis Monroe, O. B. Ficklin, A. J. Fryer, John Van Meter, J. W. Neal, W. B. Galbreath, A. C. Barquer, J. K. Ralpin, Charleston, Ill.; Jerry Ashler, John Gambol, Wm. Lindsay, G. W. Cooper, W. T. Deashmutt, S. A. Fasig, Newton Tibbs, D. W. Tibbs, T. M. Lalle, Martinsville, Ill.; A. G. Cowden, Melrose, Ill.

Lawrence.—At the annual meeting in Pittsburgh, Feb. 24, the following directors were chosen: C. W. Cass, R. W. Cunningham, John N. Hutchinson, John B. Jackson, Charles Lanier, J. N. McCullough, L. H. Meyer. The road is leased to the Pennsylvania Company.

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia, Feb. 28, the following were chosen: President, Joseph S. Harris; Vice-President, Francis C. Yarnall; Managers, Edward W. Clark, Francis R. Cope, Samuel Dickson, Fisher Hazard, T. Charlton Henry, John Leisenring, Edward Lewis, Charles Parrish, Charles Wheeler, George Whitney, James M. Wilcox. Mr. Harris, who succeeds Mr. E. W. Clark as President, was formerly Chief Engineer, and is familiar with the company's property and business; for some time past he has been General Manager of the New Jersey Central.

Lehigh & Wilkesbarre Coal Co.—At the annual meeting in Philadelphia last week the following directors were chosen: Francis S. Lathrop, G. G. Haven, John Kean, Frederick A. Potts, Charles Parrish, John S. Barnes, W. J. Tillinghast.

Louisville, Evansville & St. Louis.—Mr. George F. Evans, Treasurer, has been chosen Secretary also, in place of George Lyman, resigned.

New York & Boston Inland.—The directors of this company as organized in Connecticut are: C. B. Adams, John B. Adriance, George Cook, Samuel W. Hurlburt, N. W. Merwin, George E. Spare, New Haven, Conn.; Edward N. Shelton, Birmingham, Conn.; S. L. Ham, Peabody, Mass.; Chas. E. Bigelow, Clinton, Mass.; William Rotch, Jamaica Plain, Mass.; H. A. Blood, Fitchburg, Mass. The officers have not been announced as yet.

Northern Central.—At the annual meeting in Baltimore, Feb. 23, the following directors were chosen: B. F. Newcomer, George Snaill, S. M. Shoemaker, Harry Walters, Baltimore; Henry Gilbert, Harrisburg, Pa.; John P. Green, Samuel C. Huey, John N. Hutchinson, Wistar Morris, Dell Noblit, George B. Roberts, Edmund Smith, Philadelphia. Mr. Roberts subsequently resigned, and the board elected Mr. A. J. Cassatt a director in his place. The board then elected George B. Roberts President; A. J. Cassatt, Vice-President; Stephen W. White, Secretary; John S. Leib, Treasurer.

Under the charter of the company a director cannot be chosen President.

Ohio Central.—At the annual meeting in Toledo, O., Feb. 24, the following directors were chosen: D. P. Eels, Cleveland, O.; Charles Foster, Samuel Thomas, Columbus, O.; Calvin S. Brice, Lima, O.; Thomas Ewing, Lancaster, O.; Joseph S. Miller, Wheeling, W. Va.; Francis O. French, John T. Martin, Nelson Robinson, George I. Seney, Daniel Sherar, New York.

Pacific & Great Eastern.—The directors of this new company are: M. LaRue Harrison, E. B. Harrison, James Van Moose, Washington County, Ark.; Powell Clayton, James Pollock, Little Rock, Ark.; Jasper W. Parrish, Chicago; P. B. Roberts, New York.

Pittsburgh & Castle Shannon.—At the annual meeting in Pittsburgh, Feb. 21, the following were chosen: President, J. E. Crinan; directors, James McMathers, K. Rohrkaste, C. Kohlmyer, Walter Chess, M. Rolfe, S. Kaufman, S. Gallinger, P. Schuchman, Wm. Loeffler, F. N. Stuckey.

Richmond & Danville.—Mr. W. R. Riddick is Acting Purchasing Agent in place of R. H. Duesberry, resigned.

The Car Record and Mileage Office was removed on March 1 from Richmond, Va., to Charlotte, N. C., to which place reports should be sent hereafter. Mr. W. A. Moody continues in charge of the office.

St. Louis, Keokuk & Northwestern.—Mr. W. E. Forker has been appointed Train-Master, with headquarters in Keokuk, Ia., in place of C. E. Moody, resigned.

Southern Central.—Mr. James G. Knapp has been again appointed Superintendent. He recently resigned intending to go into business in Chicago, but the company has finally persuaded him to come back to the road.

Trunk Lines Advisory Commission.—Mr. Thomas E. Moore, who has been Secretary and Statistician of the Indianapolis pool since its organization, has been appointed Secretary of the Advisory Commission, which is to report on differences in rates to seaboard cities.

Virginia Midland.—At the annual meeting in Alexandria, Va., Feb. 21, the following were chosen: President, John S. Barbour; directors, C. G. Holland, Danville, Va.; C. M. Blackford, Lynchburg, Va.; R. A. Coghill, Amherst, Va.; W. H. Payne, Fauquier, Va.; John T. Lovel, Warrenton, Va.; A. S. Buford, Joseph Bryan, J. H. Dooley, T. M. Logan, Wm. H. Palmer, Richmond, Va.; R. T. Ballwin, J. Wilcox Brown, Baltimore; W. P. Clyde, W. Bayard Cutting, New York.

Washington & Atlantic.—At a meeting held in Baltimore, Feb. 23, the following directors were chosen: W. W. Blunt, Jerome Bradley, F. J. Herm, F. Hickman, E. C. Hancock, P. P. Robinson, Joseph Vilas. The board elected F. J. Herm President; Jerome Bradley, Secretary.

PERSONAL.

—Mr. C. G. Patterson has resigned his position as General Manager of the Connotton Valley road.

—Mr. Thomas Robertson has resigned his position as Master Mechanic of the Cleveland & Marietta road.

—Mr. John S. Newman, an old and prominent citizen, died in Indianapolis, March 1. He was at one time President of the old Indiana Central Company.

—Mr. R. H. Duesberry, Purchasing Agent of the Richmond & Danville Company, has resigned that position and will engage in the railroad supply business.

—It is reported from Chicago that Mr. Hugh Riddle will retire from the presidency of the Chicago, Rock Island & Pacific Company in June next, to secure needed rest.

—Mr. J. C. Hamilton, General Agent of the St. Paul, Minneapolis & Manitoba road, and formerly connected with the Red Line, died in Minneapolis, Minn., Feb. 19.

—Mr. Feldpauche, Chief Engineer of the Philadelphia, Wilmington & Baltimore Railroad, was married at Green Tree, Chester County, Pa., on Feb. 16, to a daughter of Mr. David Gill.

—Mr. David R. Murchison, a prominent merchant of Wilmington, N. C., and for some years Receiver and afterward President of the Carolina Central Company, died Feb. 28 in New York. He was 45 years old.

—Mr. John D. Davis, who died in Ft. Wayne, Ind., Feb. 14, aged 66 years, was the first Secretary of the old Ohio & Indiana Company, and was for 20 years agent at Ft. Wayne for its successor, the Pittsburgh, Ft. Wayne & Chicago.

—Mr. C. H. Allen has resigned his position as General Manager and Agent for the purchasers of the Florida Central and the Jacksonville, Pensacola & Mobile roads, to accept the agency in America of an Amsterdam

dam capitalists. Mr. Allen has had much experience on railroads.

—Mr. John S. Barbour, President of the Virginia Midland Company, who was recently re-elected, is now in his twenty-fifth year of service, having been President of the company through many vicissitudes. During that time the company has had four different names and has been reorganized as many times.

—Mr. Adolph C. Poppenhausen died at his residence in College Point, N. Y., Feb. 26. He was formerly a director and for a time President of the Long Island Railroad Company, of which his father was then the chief owner, and was also President of the Flushing & North Side Company, and a director of the South Side Railroad Company.

—At the annual meeting of the Lehigh Coal & Navigation Company Feb. 28, the following was unanimously passed:

"Whereas, In the view of the retirement of Mr. E. W. Clark from the presidency of the company after an active service of 14 years, the stockholders desire to record in permanent form their sense of the value of his labors. It is therefore unanimously resolved by this meeting: *First*, That in assuming the control of the affairs of this company at a critical period in its history, when its credit was depressed and its condition seriously embarrassed, Mr. Clark undertook a task of great importance and responsibility. *Second*, That in his successful reorganization of its departments, in the financial plans which have resulted in the re-establishment of its credit, in the systematic development of its resources, in the persistent energy by which its property has been made increasingly productive and its dividends resumed, and in the faithfulness by which its interests have been guarded, his character and abilities have been conspicuously manifested. *Third*, The stockholders hereby tender to Mr. Clark their sincere thanks for his eminent services, with the assurance of their full approbation of the benefits that have resulted from his administration. *Fourth*, That these proceedings be entered in full upon the minutes of this meeting, and the secretary be directed to send to Mr. Clark an engrossed copy of the same."

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Month of January:	1882.	1881.	Inc. or Dec.	P.c.
Buff. Pitts. & West.	\$53,084	\$39,832	I. \$13,252	33.1
Net earnings.....	25,747	8,074	I. 17,673	196.2
Northern Central.....	407,368	386,156	I. 21,212	5.2
Net earnings.....	92,609	140,186	D. 47,577	33.9
Pennsylvania.....	3,373,321	3,189,215	I. 184,106	5.8
Net earnings.....	1,074,066	1,206,661	D. 132,595	11.0

Second week in February:	1882.	1881.	Inc. or Dec.	P.c.
Chic. & Eastern Ill.	\$32,799	29,271	I. \$3,528	12.0
N. Y. & N. England.	54,721	43,404	I. 11,317	26.1

Third week in February:	1882.	1881.	Inc. or Dec.	P.c.
Denver & R. G.	\$101,216	\$72,108	I. \$29,108	40.4
Northern Pacific.....	72,000	19,700	I. 52,300	265.5

Three months ending Dec. 31:	1881.	1880.	Inc. or Dec.	P.c.
Euro. & N. American	\$135,373	\$121,104	I. \$14,269	11.8
Maine Central.....	513,031	463,236	I. 50,795	10.9
New Haven & Derby	43,320	35,061	I. 8,259	23.6

Month of December:	1882.	1881.	Inc. or Dec.	P.c.
Central Iowa.....	\$120,122	\$84,968	I. \$35,154	41.4
Net earnings.....	31,424	32,037	D. 613	1.9
Danbury & Norwalk.....	15,190	15,984	D. 794	4.9
Euro. & N. American	37,906	34,928	I. 2,978	8.5
Maine Central.....	150,871	143,153	I. 7,718	5.4

Grain Movement.

For the week ending Feb. 18 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports, have been, in bushels, for the past six years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1877.....	2,516,592	1,016,305	1,806,919
1878.....	2,379,274	1,671,283	3,514,860
1879.....	2,791,224	1,603,992	4,270,408
1880.....	3,356,490	1,141,510	2,489,995
1881.....	1,264,188	1,433,421	3,197,435
1882.....	3,205,050	2,355,015	1,970,752

The receipts of the Northwestern markets are nearly 80 per cent. more this year than in the corresponding week of last year, but last year they were greatly limited by snow blockades. They are a little less than in 1880, but larger than in any previous year. They are, however, a quarter less than the previous week and much the smallest for six weeks. During the five weeks previous they had averaged 4,818,000 bushels a week, and now fall to 3,205,000. The shipments of these markets are 64 per cent. more than in the corresponding week of last year, and very much more than in any preceding year. They are, however, 536,000 bushels less than the week before, and less than in any previous week since Jan. 7. The Atlantic receipts were 38 per cent. less than in the corresponding week of last year, and much smaller than in any corresponding week since 1877. They were also 424,000 bushels (17 1/2 per cent.) less than the previous week, and the smallest for three weeks. From Jan. 1 to Feb. 18, the Atlantic receipts this year have been but 14,919,436 bushels, though the Northwestern shipments have been 19,772,671. Last year in these seven weeks the Atlantic receipts exceeded the Northwestern shipments by 5,449,734 bushels; this year the Northwestern shipments have exceeded the Atlantic receipts by 4,853,235 bushels.

Of the shipments for the week this year 141,543 bushels, or 6 per cent., went down the Mississippi.

Of the Northwestern receipts, Chicago had 34.2 per cent., St. Louis 29, Peoria 14.2, Milwaukee 10.6, Detroit 5, Toledo 4.4 and Cleveland 2.6 per cent. The decrease of the week fell chiefly on Chicago, Peoria and Toledo, but there was everywhere a decrease.

Of the Atlantic receipts, New York had 54 per cent., Boston 16.6, Philadelphia 13.1, Baltimore 9.8, New Orleans 5.2, Montreal 0.8, and Portland 0.5 per cent. The distribution does not vary greatly in proportions from what it has been before this year.

Exports from Atlantic ports for five successive weeks have been:

	Feb. 22.	Feb. 15.	Feb. 8.	Feb. 1.	Jan. 25.
Flour, bbls.....	91,886	75,301	86,179	70,467	61,330
Grain, bu.....	1,533,131	1,093,643	806,367	835,440	1,171,936

1881.
Flour, bbls..... 111,022 120,932 89,284 123,920 147,994
Grain, bu..... 1,758,010 2,476,801 2,194,050 2,029,828 2,101,331
The exports last week were much larger than in any of the five, and not very much less than in the corresponding week of last year. For the week ending Feb. 18, 69.6 per cent. of the grain exports were from New York, 19.8 from Baltimore, 8.3 from Philadelphia, 2.3 from Boston, and 110 bushels from New Orleans. The total grain exports from New Orleans so far this year have been but 20,248 bushels. In the first three months of last year it exported 3,103,154 bushels, and in the first three months of 1880 3,677,351 bushels.

Receipts and shipments at Chicago and Milwaukee for the week ending Feb. 25 were:

	Receipts		Shipments	
	1888.	1881.	1888.	1881.
Chicago.....	819,640	806,022	1,045,574	953,854
Milwaukee.....	210,615	226,440	111,621	101,637
Both.....	1,030,254	1,122,462	1,157,195	1,055,491

Thus the receipts of these two places this year were 8 per cent. the very small receipts of last year, when reduced by snow blockades, and the shipments were 10 per cent. less. The receipts of these places are 36 per cent. less than the week before and much the smallest of the year.

Receipts at four Eastern ports for the week ending Feb. 25 were:

	Bushels: New York.	Boston.	Phila.	Baltimore.	Total.
1888.....	1,007,124	259,241	107,400	85,385	1,459,150
1881.....	1,088,461	390,825	537,000	708,430	2,906,716
P. c. of total:					
1888.....	69.0	17.7	7.4	5.9	100.0
1881.....	43.6	13.4	18.6	24.4	100.0

Philadelphia and Baltimore received but 13.3 per cent. of the whole this year, against 43 per cent. last.

Exports from Oregon ports in January were 871,961 bushels of wheat and 38,918 barrels of flour, a total, reducing flour to wheat, of 1,066,561 bushels. The exports were all by sailing vessels and to European ports.

Coal Movement.

Coal tonnages for the week ending Feb. 18 are reported as follows:

	1888.	1881.	Inc. or Dec.	P. c.
Anthracite.....	493,930	324,826	D. 169,104	23.2
Semi-bituminous.....	98,503	81,426	I. 17,077	20.9
Bituminous, Penna.....	63,142	58,896	I. 4,246	7.2
Coke, Penna.....	58,320	46,933	I. 11,387	24.2

Anthracite is still in larger supply than demand, and an excess of some sizes is reported at tidewater shipping points. Shipments of bituminous are still behind orders, and more cars are needed, though a better supply than heretofore is reported.

The Official Accountant's report of anthracite coal tonnage for January, differing somewhat in form from the weekly reports, is as follows:

	1888.	1881.	Inc. or Dec.	P. c.
Philadelphia & Reading.....	408,367	392,159	I. 16,208	4.1
Lehigh Valley.....	359,216	330,756	I. 28,460	8.6
Central of N. J.....	294,292	236,814	I. 57,478	11.6
Delaware, Lackawanna & Western.....	291,514	269,327	I. 22,187	8.2
Delaware & Hudson Canal Co.....	222,401	187,073	I. 35,328	18.9
Pennsylvania Railroad Co.....	165,992	155,742	I. 10,250	6.6
Pennsylvania Coal Co.....	96,186	70,835	I. 25,351	35.7
N. Y., Lake Erie & Western.....	25,943	29,939	D. 3,996	13.4
Total.....	1,833,911	1,672,645	I. 161,266	9.6

The stock of anthracite coal on hand at tidewater shipping points on Jan. 31 was 586,933 tons, against 497,024 tons Dec. 31, an increase of 89,909 tons during the month.

Coal shipments from the Nova Scotia and Cape Breton collieries for the year ending Dec. 31 were:

	1881.	1880.	Inc. or Dec.	P. c.
Nova Scotia.....	495,406	567,207	D. 71,801	12.7
Cape Breton.....	511,268	386,230	I. 125,038	32.4
Total.....	1,006,674	953,437	I. 53,237	5.6

The decrease in the Nova Scotia output was due almost entirely to the accident at the colliery of the Halifax Coal Co., and the consequent stoppage of work there.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the two months ending Feb. 25 was as follows:

	1888.	1881.	Inc. or Dec.	P. c.
S. Amboy for shipment.....	96,684	76,208	I. 20,476	26.9
Local distribution on N. J. lines.....	93,515	135,976	D. 42,461	31.2
Co.'s use on N. J. lines.....	21,012	18,043	I. 2,969	16.5
Total.....	211,211	230,227	D. 19,016	8.2

Of the total this year 162,438 tons were from the Lehigh, and 48,773 tons from the Wyoming Region.

Chicago and Milwaukee Receipts.

Receipts for the month of February for four successive years have been:

	1879.	1880.	1881.	1882.
Chicago:				
Grain, bush.....	5,264,951	5,227,871	4,057,134	5,375,662
Flour, bbls.....	279,438	163,714	432,409	397,907
Hogs, No.....	486,188	602,583	462,520	425,848
Milwaukee:				
Grain, bush.....	1,149,476	1,050,438	818,556	1,399,796
Flour, bbls.....	191,361	122,771	228,696	251,893
Hogs, No.....	41,454	62,462	35,906	33,672

The grain and flour receipts for the month are larger this year than in any of the other three years, but they have fallen rapidly from week to week, as will appear from the following statement of the grain and flour (reduced to bushels) receipts in each week of the month:

Week to—	1879.	1880.	1881.	1882.
Feb. 7.....	2,260,594	1,542,360	2,294,795	3,237,441
Feb. 14.....	2,223,210	2,164,330	1,939,901	2,670,266
Feb. 21.....	2,076,013	1,809,716	1,284,932	2,217,555
Feb. 28.....	1,993,205	2,051,185	2,330,899	1,574,295
Month.....	8,553,022	7,567,491	7,850,527	9,699,557

This year the receipts were not half as great in the last week as in the first week of the month, and were 32½ per cent. less than in the corresponding week of last year, though for the whole month the receipts were 23½ per cent. more than last year, 28 per cent. more than in 1880, and 13½ per cent. more than in 1879.

Pacific Through Freights.

Shipments of through freight eastward from California in January were as follows, in tons:

	Central Pacific.	Southern Pacific.	Total.
San Francisco.....	2,989	2,013	5,002
Interior points.....	573	881	1,454
Total.....	3,562	2,894	6,456

The Southern Pacific took 44.8 per cent. of the total. Its share from interior points included 224 tons from Los Angeles, which would hardly go to the Central at all.

The chief items of freight were 1,446 tons of wool and 598 tons of barley. No wheat is included in the shipments, but 29 car-loads of flour were sent—8 car-loads by the Central and 21 by the Southern Pacific.

Iowa Pool Meeting.

A dispatch from Chicago, March 1, says: "The officers of the different Chicago lines terminating at Council Bluffs held a meeting yesterday to discuss their future relations with the Missouri Pacific Railroad, whose extension to Omaha will, it is expected, be completed by June 1, when it will apply for admission to the Iowa pool. No action could be taken, but a telegram was sent to the officers of these lines, now in New York, asking them to confer with the officers of the Missouri Pacific in reference to the matter."

A Novel Railroad War.

A dispatch from Kansas City, March 1, says: "A novel war has broken out among the railroad men in this city. Heretofore, by the force of circumstances, all scalpers have been obliged to have their offices under the hill, in the vicinity of the Union Depot, while the regular ticket offices are all up-town. Recently a scalper moved into an office in the neighborhood of the up-town offices, and the latter at once combined to expel the intruder. An agreement to withdraw from all business relations with this scalper unless he returned to the river bottom was signed by the officers of all the roads except the Chicago & Alton. The latter maintain that so long as the regular lines recognized scalpers they should not dictate as to the place of their offices."

Ticket Commissions.

A dispatch from Chicago, Feb. 25, says: "The Chicago-Burlington & Quincy Railroad has withdrawn from its compact to prevent agents from receiving commissions for the sale of tickets from other roads than its own."

Southwestern Railway Association.

At a meeting last week the Hannibal Division was consolidated with the Chicago Division, which latter now gets 55½ per cent. of the whole traffic. The arrangement is understood to be such that the Hannibal & St. Joseph gets the same as before. A redistribution of the traffic of the Chicago Division is said by one report to have been made, giving the Wabash 10 per cent. instead of 8, as heretofore. Another report says the roads were unable to agree upon a new division. The allowance to the Chicago, Burlington & Quincy on account of putting the traffic of its Nebraska lines into the pool, and to the Missouri Pacific on account of the Central Branch road have not yet been fixed.

RAILROAD LAW.

Limitations of Carriers' Liability. — Connecting Lines.

In Gann & Reaves against the Georgia Railroad and Banking Co., recently, the Georgia Supreme Court held as follows:

1. The verdict is supported by the evidence.
2. A general stipulation or notice in a bill of lading will not limit the liability of a common carrier; an express contract is necessary for that purpose. Such is the meaning of the charge in this case.
- (a). An express contract will not protect a common carrier from the results of its own negligence in running its trains.
3. Where goods are shipped over a connecting line of railroads, the last road of the line receiving them as in good order, for transportation, is liable to the consignee for damages.

(a). Goods are billed from St. Louis, Mo., to Athens, Ga.; as far as Atlanta, Ga., though rates of freights were paid, and from Atlanta to Athens local rates were charged.

Held, that even if this did not make the Georgia Railroad (from Atlanta to Athens), liable as the last road of through line, still the receipt by it of the goods for transportation without exception was impliedly a receipt as in good order, and would render that road liable for damages occurring thereto.

Judgment affirmed.

Rights of Express Companies.

The United States Circuit Court in St. Louis, on Feb. 23, gave its decision in the case of the Southern Express Co. against the St. Louis, Iron Mountain & Southern Co. This was a test case, and the decision affects not only the Iron Mountain, but also the Memphis & Little Rock, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe, and the Denver & Rio Grande.

The opinion, delivered by Mr. Justice Miller, holds that a court of equity can compel railroad companies to provide facilities for the express business, to furnish cars for that purpose, and to afford equal facilities to all express companies actually engaged in that business. Only fair and reasonable rates shall be charged for carrying such matter and the agent in charge of it. The rate cannot be fixed in advance by the railroad company, nor can collections be made at the end of each journey, but the courts can regulate the compensation for such service after it has been performed, and the railroad companies can be protected by a bond to be given by the express company.

New Jersey Railroad Law.

The law authorizing the issue of new stock by railroad companies to retire bonds, the text of which was given last week, was vetoed by the Governor, but afterward passed over the veto by the Legislature, and is now a law.

THE SCRAP HEAP.

Locomotive Building.

The Manchester Locomotive Works at Manchester, N. H., last week shipped five engines to the Minneapolis & St. Louis road.

The Dickinson Manufacturing Co. at Scranton, Pa., is building some engines for the Boston, Hoosac Tunnel & Western Railroad.

The Boston & Albany shops at Springfield, Mass., have just turned out a new freight engine with 20 by 26 in. cylinder.

Car Notes.

The Ohio Falls Car Works at Jeffersonville, Ind., have recently delivered a large number of gondola cars to the East Tennessee, Virginia & Georgia roads.

The Latrobe Car Works at Latrobe, Pa., have recently been enlarged, and are very busy on orders.

The Missouri Car & Foundry Co. in St. Louis is turning out eight box cars a day. Most of the work at present is for the Louisville & Nashville road.

The American Brake Co. of St. Louis now has its system of freight car brakes in use on 30 locomotives and 600 freight cars on the St. Louis & San Francisco road.

Milliken, Boyd & Co., at Youngstown, O., are building a number of freight cars, and also iron dump cars for furnace and mill use.

The Green Car-Wheel Manufacturing Co. in St. Louis has its works fully employed.

The Ontario Car Co. at London, Ont., recently delivered 100 box cars to the Great Western road, and is building a large number for the same road.

The Keith Car Manufacturing Co. at West Sandwich, Mass., is putting in new machinery and a new engine of 60 horse-power.

The Seeger Manufacturing Co. at Springfield, Mass., reports large sales of its car-box jack made in its shops. These jacks, under careful tests, have sustained pressures of 25 and 30 tons without damage, and have lifted from 6 to 10 tons each. The company also makes other styles and sizes for lifting freight cars, and turns out small castings,

making a specialty of soft castings for locomotive flue thimbles and similar work.

The Bellefonte Car Works at Bellefonte, Pa., are offered for sale for \$50,000. The works are now building 300 gondola cars for the New York, Lake Erie & Western road; they built last year 500 cars for the Pennsylvania road.

The New York Live Stock Express Co. will shortly put a live stock express train to run between Chicago and New York over the New York Central and Lake Shore roads. The cars are provided with facilities for feeding and watering stock and have movable partitions by which they can be divided into stalls or compartments. They have passenger running gear, automatic brakes and continuous draw-bars, and are expected to make very nearly passenger-train time.

The Virginia and Truckee shops at Carson, Nev., are building 50 box cars for the Carson & Colorado road.

The shops of the Oregon Railway & Navigation Co., at the Dalles, Or., recently turned out a new pile-driver car for use on the road.

Iron and Manufacturing Notes.

The Chalmers-Spence Co., R. H. Martin General Manager, has removed from No. 10 Courtlandt street to more spacious quarters at No. 23 John street, New York. The company manufactures boiler and pipe coverings and the natural boiler and tube cleaner.

The Pittsfield Iron & Steel Co., a Boston organization, is building a furnace and a forge for making charcoal blooms at Pittsfield, Mass. Local ores will be used.

The Chicago Splice Bar Mill of Morris Sellers & Co. is being repaired and enlarged to nearly double its former capacity for production.

It is said that a new mill for rolling iron will be built at Coatesville, Pa., by Philadelphia parties.

James Rees, in Pittsburgh, is building two steel-hull steamboats for service on South American rivers, and another boat of the same class to go to Russia.

Isabella Furnace, at West Nantmeal, Pa., has had to go out of blast, having chilled.

The Duquesne Forge of Wm. Miller, Son & Co., in Pittsburgh, recently completed a steel shaft weighing four tons for a river steamboat.

Work has been begun on the new rolling mill at New Philadelphia, O. It will make bar and sheet iron.

Wythe Furnace in Southwestern Virginia was recently sold at public sale for \$21,000 to James S. Crockett and others.

Low Moor Furnace in Allegheny County, Va., is making 720 tons of iron a week, a larger output than ever before.

The Nashua Iron & Steel Co. at Nashua, N. H., recently shipped a steel shaft weighing eight tons to San Francisco. The company is building a new steam hammer for its own use.

The Rail Market.

An active inquiry for steel rails is reported. Quotations continue at \$56 to \$58 per ton at mill, with a probability that \$55 would be accepted on large orders. More demand for light sections is reported, and they are quoted at \$60 to \$62.50.

Iron rails continue quiet and unchanged, with very little business doing. Quotations are nominal at \$48.50 to \$52, according to section.

Spikes are quiet at \$3 to \$3.15 per 100 lbs. Fish plates, \$2.60 to \$2.75; track bolts, \$1.75 to \$4.25.

There is some demand for old iron rails in small lots and sales are reported at \$30 to \$31.50 in Philadelphia; \$30 to \$32 in New York.

British Rail Exports.

Exports of iron and steel rails from Great Britain in the month of January for three successive years are reported as follows by the Board of Trade, in tons of 2,240 lbs:

	1880.	1881.	1882.
To United States:			
Iron.....	7,941	5,663	8,763
Steel.....	7,350	1,705	18,504
Total.....	15,291	7,368	27,267
To all Countries:			
Iron.....	11,143	7,084	11,105
Steel.....	28,916	23,240	56,798
Total.....	40,059	30,324	67,901

The exports of both steel and iron to the United States were larger than in either 1881 or 1880, and the total was three and a half times as much as last year. Compared with previous months, we find that the January exports to the United States were the largest since August, and were much above the average of 1881 (which was 24,303 tons, against 27,267 in January). The exports of iron are the largest since June, but those of steel are smaller than in any months of 1881 except the first two and the last two.

The British exports to all countries in January were 124 per cent. more than in 1881 and 60½ per cent. more than in 1880. Of the total exports 79 per cent. of the iron rails and 32½ per cent. of the steel went to this country. India and Australia are the only other countries that take large quantities.

An Imposter.

Messrs. Burnham, Parry, Williams & Co., of the Baldwin Locomotive Works, desire to give warning against a person who, they have found, has had letter-heads printed as from "The Baldwin Locomotive Works, Philadelphia, Fred. W. Nicholson, Agent."

They do not know Mr. Nicholson and have no agent of that name, and they believe that his purpose is undoubtedly fraud.

Steamers for Carrying Iron Ore.

The steamer "Massachusetts," nearly completed at Detroit, is a double decker of the following dimensions: Length of keel, 235 ft.; over all, 250 ft.; breadth of beam, 37 ft. 3 in.; molded depth, 22 ft.; depth of hold, 18 ft. 5 in., leaving a water space between the plank and ceiling of 4 ft. 4 in. The vessel is to be used in carrying iron ore from Escanaba to Chicago, and will tow a consort, the "Merrimac," of about the same size. They will be ready to put in service when navigation opens.

An Unlucky Trip.

An unusual series of mishaps accompanied the Cincinnati train which was wrecked at Montmorenci. It required five engines to bring it through from Cincinnati to Kankakee. No. 23 started with it from Cincinnati, but broke down a short distance out. No. 36 was then taken off a side track and attached, bringing the train to Indianapolis; but just as the train stopped in the yard a wheel under the engine dropped off. No. 11 then drew the train as far as Colfax, where one of the grate bars broke, letting the fire into the ashpans. No. 57 then coupled on and ran as far as Montmorenci where it ran off the track and caused the wreck reported in last week's paper. No. 67 was then pressed into service and brought the train into Kankakee. The regular change of engines was then made to get the train into Chicago. The conductor of that train must have thought the "old boy" was with him that trip, sure.—Kankakee (Ill.) Gazette, Feb. 16.

A Narrow Escape.

A young woman named Mrs. Peter Anderson had a most singular escape from death at Moline, Ill., the other day.

She was walking on the railroad track near her home and stepped from one track to the other to avoid a passing train. She did not notice that a switch train of nine cars and a locomotive was backing toward her on the track she had just taken. She was thrown on her back between the rails, falling with her feet elevated. The axles and brake rods of the various cars kept her feet up, until at last, when all the cars had passed over her, the fire box of the engine caught and moved her along about six feet, when a cattle guard was encountered and Mrs. Anderson fell through between the rails. Her shoes and stockings had been torn completely off, and the calves of her legs and the whole nether side of them had been badly bruised. The skin had been torn off both heels, but no bones were broken.

A Wreck-Train Dining Car.

The Fitchburg Railroad Company is fitting up a dining car for the use of the men on the wrecking train. A passenger car has been taken for the purpose and one end is to be made into a kitchen, while the remaining portion will be equipped with swinging tables at which the workmen can eat. It will accompany the wrecking train and will be well appreciated by the men.

Breaking a Freight Blockade.

Yesterday indeed deserves to pass down into history as a remarkable one in the annals of the Fort Wayne Railroad. In the 18 hours between 6 a. m. and 12 midnight seven miles of cars, nearly all of them loaded, were sent from the crowded yards of the Pennsylvania Railroad over the first named road; and that all was accomplished without accident or delay to the regular trains is a large-sized feather in the caps of those in charge, from Manager Baldwin and Superintendent Starr, down to the hardest-worked brakeman on the Eastern Division.

During the last week it was decided that something must be done to relieve the pressure. The Baltimore & Ohio and the Southwest Branch of the Pennsylvania Railroad were blocked with coke-laden cars, while Western furnacemen were clamoring for the fuel. Merchants and manufacturers were besieging the offices and vowing all sorts of vengeance if their freight wasn't started. Finally, leading officers of the Pennsylvania Railroad assembled in the office of Manager W. A. Baldwin on Friday, and the troubles were freely discussed.

"Can you take eight or nine hundred cars off our hands?" asked the Pennsylvania Railroad men, with some doubt in their combined voices.

"We will take 1,200," said Mr. Baldwin, and the meeting broke up.

Then the work of preparation began. Every available engine was placed in readiness and repairs to the iron horses in that veterinary hospital, the shops, were hurried forward, and engineers, firemen, conductors, switchmen, brakemen and flagmen notified of the impending conflict between motive power and inert, heavy-laden rolling stock. Through Saturday and Saturday night the work went on, and at daylight yesterday the first train pulled out of the Fort Wayne yards at Allegheny. The Ohio Valley, from this city to Beaver, echoed to the perpetual rumble of freight trains, and the worshippers in country churches along the line marveled at the unwonted racket, while some of the more godless who sunned themselves outside were equally surprised. Single engines and a solitary red caboose seemed to enjoy a monopoly of the east-bound track, as they made express train time back to the city from Homewood and Alliance to be attached to fresh loads and puff more laboriously westward.

Seventeen engines and crews were detailed for the run between Allegheny and Homewood and Rochester, and returned after each trip. Four engines and crews were assigned the run to Alliance and return, and one engine—No. 346—covered herself with glory by taking a heavy train from Allegheny to Alliance, 82 miles, returning light, buckling to another big train and finally making a trip back to earned rest, after covering 246 miles. Seven engineers who had already made their usual runs, turned about and took trains out to Alliance. Fifty-five trains in all were thus sent out, 50 of these with Fort Wayne engines and crews, and five with Cleveland & Pittsburgh engines and crews. The grand total of cars moved was 1,119, including 981 cars over the Pittsburgh, Fort Wayne & Chicago and 138 over the Cleveland & Pittsburgh road (to Rochester). Sixty locomotives were kept busy, including two passenger and one gravel train engine pressed into the service. Of the cars moved, only 167 were empty, and besides the total already enumerated, 363 loaded and 114 empty eastbound cars were delivered to the Pennsylvania Railroad Company. Of the cars moved about 70 per cent. were loaded with coke, the Baltimore & Ohio road contributing 200 and the Southwest branch 250. The engines of the Baltimore & Ohio helped to the extent of 416 cars sent over, while the Fort Wayne engines handled the balance. The Baltimore & Ohio road had promised a contribution of 900 cars, but responded with 200.

The average daily movement of west-bound freight cars, it might be added, over the Ft. Wayne tracks, has been since the 1st inst., of coke alone 210 cars, and 40 cars more for the Cleveland & Pittsburgh, while the total of all kinds has been 600 loaded and empty. Altogether yesterday was a great day on the Ft. Wayne.

From Mr. Baldwin it was learned that this effort has raised the blockade effectually, that the Pennsylvania Railroad will hardly permit another such accumulation in its yards, and that it is therefore scarcely possible that another such mighty effort will be required.—Pittsburgh Telegraph, Feb. 27.

Car Changes.

Cars, as well as men, come down in the world. Jim Fisk's old private car on the Erie has recently been rebuilt and made into a tool car at the Susquehanna shops. But perhaps the car has gained in usefulness what it has lost in style.

There are palace cars of various sorts. The palace stock car, one might suppose, was the lowest grade, but an exchange tells of the "fine and elegant finish and the peculiarly light and graceful outlines" of the coal cars turned out of a local shop, and of "the good taste which characterizes their painting and lettering." Clearly these are palace coal cars, and are not to be confounded with the ordinary coal jimmy of commerce.

It is told of one of the original directors of the old New Jersey Railroad Company, that when a proposition was made in the board to have curtains put to the windows of the cars he strongly opposed it. If they made the cars too comfortable, he said, people would be tempted to travel in them to the neglect of their proper business; all the world would take to gadding about instead of staying home and working, and more passengers would come than the road could conveniently carry. That director has been dead a good many years now, but his spirit animates some railroad directors to the present day.

OLD AND NEW ROADS.

Atlantic & Pacific.—The Boston Transcript of Feb. 25 says: "The Atchison, Topeka & Santa Fe Railroad Company and the Southern Pacific Railroad Company effected

a compromise in Boston yesterday, by which the Atlantic & Pacific road is to be completed this year to the Colorado River, and the Southern Pacific Company will build to meet it. The latter will give the first mortgage Atlantic & Pacific bonds a 25 per cent. rebate guarantee. The Atlantic & Pacific Railroad Company surrenders no rights, but agrees to reduce the present subscription from \$16,500,000 to \$6,000,000. The Atchison directors regard the compromise as satisfactory, inasmuch as neither the Atlantic & Pacific nor the Atchison, Topeka & Santa Fe surrenders any of its rights to build in California."

Boston, Hoosac Tunnel & Western.—The Attorney General of New York has begun a suit to annul the charter of this company in New York and wind up its affairs. The grounds of the complaint are that the company has exceeded its corporate powers and that it was not legally formed in the first place, the law not permitting the consolidation of companies having no road built. It is also charged that the company has executed mortgages on railroads not even located, and has otherwise violated the provisions of the law.

Buffalo, New York & Philadelphia.—A new consolidated mortgage, to secure an issue of \$11,000,000 of bonds, has been executed and put on record by this company. The United States Trust Company, of New York, is trustee.

Camden & Atlantic.—The May's Landing Railroad Company has begun suit to enforce payment of rental for its road, which this company has recently abandoned. The Camden & Atlantic Company claims that the lease is not legal or binding, never having been ratified by the stockholders.

At the annual meeting in Philadelphia last week there was a sharp contest over the election of directors, which resulted in the choice of the ticket favored by the old management. It is understood that the new board is in favor of leasing the road to the Pennsylvania Railroad Company, while the opposition preferred a lease or sale of the road to the New Jersey Central.

Central, of New Jersey.—The Governor of New Jersey has vetoed the bill noticed last week, which permits the issue of new stock to replace bonds of a corporation, and which was specially applicable to this company's case. The Legislature has passed the bill over the veto and it is now a law. Both parties still continue to claim a majority, independent of any new issues.

The Garrett-Gowen party have begun a new suit in the United States Circuit Court to enjoin the company from issuing any new stock. The grounds are the same as in the New York suit. The Court has issued the usual preliminary injunction and order to show cause why it should not be continued, the order being returnable March 7.

Chicago, Burlington & Quincy.—This company has given formal notice of an issue of 78,950 shares of new stock in exchange for the scrip certificates of the Republican Valley Railroad Company, which were issued some time ago.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company makes the following statement for the half-year from July 1 to Dec. 31:

Gross earnings	\$1,291,241.63
Expenses	637,386.35
Net earnings	\$653,855.28
Interest and taxes	361,833.75
Surplus	\$292,021.53
From this surplus dividends amounting to \$180,000 were paid, leaving a balance of \$82,021.53 to profit and loss.	

Cleveland, Tuscarawas Valley & Wheeling.—The Union Trust Company, of New York, Trustee, on Feb. 20 began suit in the United States Circuit Court against this company, and the Court granted an order for the appointment of a receiver. The road extends from Lorain, O., to Bridgeport, and was formerly known as the Lake Shore & Tuscarawas Valley; the present company succeeded to the property through foreclosure of a second mortgage. The road is chiefly a coal road. The complaint in the suit states that the total amount of indebtedness which is secured by mortgages, and is a lien on the property of the company, amounts to \$4,880,000, not including interest, and that the floating debts unsecured amount to not less than \$400,000, exclusive of interest, making the total indebtedness of the company, due and to become due, not less than \$5,280,000, not including the rolling-stock debt, which amounts to \$563,000. All the bonded indebtedness except \$700,000 is the subject of a special contract in default, with interest since 1878.

Connoton Valley.—A suit has been begun by Strong & Carey, contractors, against C. G. Patterson, General Manager and contractor for this road to recover \$155,000, part of the claim being for work actually done on the main line and part for damages for failure to carry out a contract for building the Straitsville Branch.

Cooperstown & Susquehanna Valley.—This company has decided to extend the road from the junction with the Albany & Susquehanna southward about four miles to Charlotte Creek, to meet the extension of the Ulster & Delaware road from Stamford to Oneonta.

Cornwall & Lebanon.—This company has been organized to build a railroad from Cornwall, Pa., to Lebanon, with several branches and extensions. It will serve the Cornwall iron estate and several other iron properties.

Delaware River & Lancaster.—This project has lately been revived, and it is now proposed to build 13 miles of the road, from Lancaster, Pa., to New Holland, this spring, and also to begin work on the extension from New Holland to Phoenixville.

Delaware & Slatington.—Arrangements have been completed to build this road from Pen Argyl, Pa., by Slatington to the Delaware River. It will be an extension of the Lehigh & Lackawanna road.

Georgia Pacific.—Sealed proposals for the grading, masonry and bridging of this road from Anniston, Ala., to Birmingham, 65 miles, will be received by the Richmond & Danville Extension Company at its office, No. 50 North Broad street, Atlanta, Ga., until noon of March 15 next. Profiles and specifications can be seen at the Company's offices in Atlanta or in Birmingham, Ala. Information will be given at the offices in Birmingham and Oxford, Ala., to parties wishing to examine the line.

Hartford & Connecticut Western.—The dispatch published last week in relation to this road was incorrect, exactly reversing the true state of affairs. The Rhinebeck & Connecticut road has been purchased by this company, instead of purchasing this road as then stated. This seems to be the more correct and natural arrangement. The purchase extends the Hartford & Connecticut Western through to the Hudson River at Rhinecliff, immediately opposite the outlet of the Delaware & Hudson Canal at Rondout. It is

understood that part of the payment will be made in stock of this company.

Indiana, Alabama & Texas.—Organizations have been completed in Alabama and Tennessee and will soon be completed in Kentucky, of companies which are to be consolidated under this name. The projected line of the road is from Evansville, Ind., due south to Mobile. Gen. John B. Gordon is the leading projector of the road.

Indiana, Bloomington & Western.—A suit has been begun against this company by the Cincinnati, Sandusky & Cleveland Company to settle a question arising under the lease of the Sandusky road to this company. The matter at issue is the rental received for the 24 miles of the Sandusky road, from Springfield to Dayton, which are leased to the Cleveland, Columbus, Cincinnati & Indianapolis Company. The directors of the Sandusky Company claim that the entire rental paid for this section should go to them, while the Indiana, Bloomington & Western Company claims that the rental should go into the gross receipts of the Sandusky road, and, consequently, that only the percentage agreed upon under the lease should be paid to that company. The suit is to secure an interpretation of the terms of the lease by the Court.

At a meeting held in Indianapolis, Feb. 23, the stockholders voted to approve the contract for the operation of the Indianapolis, Decatur & Springfield road.

The following circular has been issued by the Accounting Department:

"Commencing Jan. 1, 1892, all freight, mileage and ticket reports heretofore rendered to the Indiana, Bloomington & Western Railway, Indiana, Bloomington & Western Railway—Ohio Div. (formerly Cincinnati, Sandusky & Cleveland Railroad), and the Indianapolis, Decatur & Springfield Railway may be included in one report to the Indiana, Bloomington & Western Railway, and balances drawn for in one draft.

"The cars to be included in the mileage statement to the Indiana, Bloomington & Western Railway are marked, and should be shown in separate items, as follows:

"I. B. & W.—I. B. & W. I. B. & W.—E. D.
Ohio Division—I. B. & W.—O. D. (Cincinnati, Sandusky & Cleveland Railroad), C. S. & C. R. R.
St. Louis Division—I. B. & W.—St. L. Div. (Indianapolis, Decatur & Springfield Railway), I. D. & S. R'y. (Indiana & Illinois Central Railway), I. & I. C. R'y.
Also include in this statement and show separately I. B. & W. Union Line, and C. S. & C. South Shore Line cars."

Indianapolis, Decatur & Springfield.—At a special meeting in Indianapolis, Feb. 23, the stockholders voted unanimously to approve the contract under which the road is to be operated by the Indiana, Bloomington & Western Company.

Iowa Northern.—This company has been organized to build a railroad from Colfax, in Jasper County, Ia., on the Rock Island road, northwest to the Minnesota line. The office is at Newton, Jasper County, Iowa.

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia there was some discussion over the purchase by the company of a controlling interest in the Bangor Slate Company. The action was finally approved, with a proviso that the stockholders "do not wish to be understood that they are in favor of a continuance of such a policy, and that in the future all transactions looking to the investment of the company's money in other companies shall first be submitted to the approval of the stockholders."

Lookout Mountain.—The contract for building this road from Chattanooga, Tenn., to Rome, Ga., about 60 miles, has been let to James Campbell, of New York. Work will be begun at once, and the road is to be finished in one year.

Louisville, Charleston & Peoria.—This company has filed articles of incorporation for a railroad from Peoria, Ill., to Charleston, and thence to Louisville, Ky. It will be about 270 miles long.

Louisville & Nashville.—A statement from this company says that since July 1, 1880, the bonded debt has been increased by \$10,361,000 general mortgage bonds and \$2,000,000 South & North Alabama sinking fund bonds sold; \$6,500,000 St. Louis Division bonds and \$600,000 Pensacola Division bonds issued for the purchase of those properties. The subsequent issues reported in the company's statements have not been sold, but are still in the company's treasury, the intention still being to use them for funding the floating debt.

An approximate statement from July 1, 1880, to the present time is as follows:

General mortgage bonds sold	\$10,361,000
South & North Alabama bonds sold	2,000,000
Total	\$12,361,000
Cost of Nash., Chatta. & St. L. stock and Mobile & Mont. road	\$7,300,000
Cost of Pensacola & Selma Div.	750,000
Knoxville Branch and other extensions	750,000
Additions to property	6,704,000
Increase of supplies on hand	500,000
Increase of current assets	1,000,000
	17,064,000

Excess of outlay over bonds sold \$4,703,000

Provided for out of resources 1,759,000

Increase of floating debt \$2,944,000

Additions to property include \$250,000 for real estate; \$200,000 for new bridges; \$600,000 for terminal facilities in New Orleans, Pensacola and St. Louis; \$2,250,000 for steel rails; \$2,250,000 for 4,500 new freight cars; \$50,000 for 10 new passenger cars, and \$1,164,000 for 97 new engines.

Memphis & Little Rock.—Notice is given that the coupons due Jan. 1 last, on which default was then made, will be paid on presentation at the office of the Central Trust Company in New York.

Mexican National.—At a meeting held in Colorado Springs, Col., Feb. 23, the stockholders of the Mexican National Construction Company voted to issue \$3,000,000 new stock. Most of it was subscribed for after the meeting.

Mexican Central.—A circular recently issued by this company says that on the 12th of the present month the track had been laid from the City of Mexico (including the 37 miles of narrow-gauge road purchased by the company) 190 miles, and from Paso del Norte, south, 84 miles; total, 274 miles. In the next six months it is estimated that 300 miles can be built, making the total by Sept. 1, 1892, 574 miles. The road was opened for business to San Antonio Tula, 57½ miles, Sept. 15, 1881. The gross earnings on that section for three months were \$36,213.37. Dec. 15, 1881, the road was opened to San Juan del Rio, 118 miles, and the gross earnings from Dec. 15, 1881, to Jan. 31, 1882, were \$46,253.57, making the total gross earnings from Sept. 15, 1881, to Jan. 31, 1882, \$82,466.74. This does not include the earnings on the company material. There can be

The gross earnings of the other leased lines were as follows:

	1881.	1880.
Kan. City, St. L. & Chi.	\$1,263,643.72	\$1,261,991.56
Louisiana & Mo. River, Main Line.	444,820.59	429,833.19
" " " South Branch.	50,524.94	38,001.31
St. L., Jack. & Chi.	1,032,306.27	965,768.01

Total.....\$2,791,385.52 \$2,695,684.07

The earnings on these lines, the branch from Roodhouse to Louisiana and the Mississippi Bridge, were 43.13 per cent. of the entire gross earnings last year.

The income account was as follows:

Balance Dec. 31, 1880.....	\$1,500,410.10
Interest on bonds, dividends on stock and sundry receipts.....	306,791.13
Gross receipts from traffic.....	7,557,740.42

Total.....\$9,364,941.65

Interest on funded debt.....	\$762,001.40
Dividend No. 36 paid in March.....	538,988.00
" " " September.....	538,988.00
Rent paid Joliet & Chicago.....	131,355.00
" " " St. L., Jack. & Chi.....	389,662.65
" " " Louisiana & Mo. River.....	169,188.65
" " " Kan. City, St. L. & Chi.....	233,788.00
" " " Miss. River Bridge Co.....	63,000.00
Paid Wiggins Ferry Co.....	136,763.36
" " " sinking fund.....	73,988.00
" " " from this account for real estate, buildings, tracks, etc.....	431,643.74
Suspended accounts written off.....	21,758.89
Paid state, county and municipal taxes.....	171,661.75
Operating expenses.....	4,149,713.25

Balance, Dec. 31, 1881.....\$1,442,440.66

The net revenue during the year 1881, after deducting taxes, interest on bonds, rent, losses, and all sums charged in the income account (except for sinking fund and additional property purchased), is equal to 11.31 per cent. on the capital stock, both common and preferred.

The traffic for the year was as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Train miles.....	1,406,965	1,406,732	I.	60,231 4.3
Passenger.....	2,436,397	2,716,778	D.	280,381 10.3

Car miles.....

	1881.	1880.	Inc. or Dec.	P. c.
Passenger.....	7,627,152	7,038,155	I.	588,997 8.4
Freight.....	61,393,932	64,028,817	D.	2,634,885 4.1
Passengers carried.....	1,495,606	1,203,549	I.	292,057 24.3
Passenger miles.....	92,847,464	78,270,565	I.	14,576,899 18.1
Tons freight carried.....	3,275,004	3,071,788	I.	203,216 6.6
Ton miles.....	447,009,977	481,474,730	D.	34,464,753 7.2

Av. receipts: Per pass. per mile, 1.082 cts. 2.076 cts. D. 0.094 cts. 34.1
Per ton per mile, 1.241 " 1.306 " I. 0.065 " 2.9

Of the freight-car mileage 73.576 per cent. was of loaded cars. Foreign cars ran 19,470,575 miles on the road, and the company's cars ran 16,509,911 miles on foreign roads. There was a decrease in wheat and flour, chiefly on account of the very low rates from St. Louis eastward.

The coal tonnage was 1,190,241 tons; an increase of 201,095 tons, or 20.3 per cent.

Some statistics of train movement are as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Pass., number.....	63,293	55,640	I.	7,658 13.8
Freight, tons.....	183,472	177,000	I.	6,472 3.7

Receipts, passenger.....

	1881.	1880.	Inc. or Dec.	P. c.
Receipts, freight.....	115,718 cts.	132,000 cts.	D.	16,282 cts. 12.3
" " " average.....	227,067	214,000	I.	13,067 " 6.4
Expenses.....	110,700 "	98,500 "	I.	12,200 " 12.4
Net earnings.....	82,912 "	87,500 "	D.	4,588 " 5.2

The average tonnage of each loaded car was 9.896 tons; average for all cars, 7.281 tons. The above figures do not include 259,310 tons of freight hauled for the company's use.

The business to and from the three terminal cities was as follows:

	1881.	1880.	1881.	1880.
To Chicago.....	337,228	86,753	1,224,061	1,248,619
From ".....	165,442	93,383	576,486	465,121
To St. Louis.....	122,790	64,067	457,350	444,219
From ".....	124,366	71,060	327,204	329,750
To Kansas City.....	63,378	39,041	318,717	308,233
From ".....	43,838	36,713	201,945	236,130

The excess of passengers carried from Chicago over those taken to that city is notable.

President Blackstone's report says: As some of our shareholders appear to believe that our railway is mainly supported by earnings derived directly from the transportation of the products of farms, the following statements, which have been prepared from our books for the purpose of showing the gross earnings from that part of our traffic during the last year, are submitted:

	From Local Stations in Illinois.	From Local Stations in Missouri.	Total.	Per Cent. of Gross Earnings on Freight.	Per Cent. of Gross Earnings on All Traffic.
Wheat.....	\$78,364	\$49,340	\$127,704	2.302	1.689
Corn.....	347,367	22,680	370,047	6.671	4.896
Oats.....	55,560	8,700	64,260	1.338	0.982
Cattle.....	81,817	107,134	188,951	3.406	2.500
Hogs.....	162,481	92,348	254,829	4.594	3.371
Sundries (Est.).....	63,735	21,460	85,195	1.536	1.127
Total.....	\$799,324	\$301,662	\$1,100,986	19.848	14.567

"It will be seen from the above tabular statement that less than 20 per cent. of the gross earnings from freight traffic, and only about 14½ per cent. of the gross earnings from all traffic during the year, was received for transporting all kinds of farm products shipped at local stations.

The gross earnings for transporting farm products shipped at terminal stations during the year amount to \$703,125.00. This sum was mainly earned by transporting products of states other than those in which our lines are located. It is equal to 9.303 per cent. of the gross earnings during the year, and when added to the percentage of local shipments of farm products, makes the total gross earnings from traffic of that kind, equal to 23.87 per cent. of the gross earnings from all sources.

"It will be seen from the foregoing statements that the business of the country traversed by our lines, from having been at first almost entirely agricultural has already become diversified.

"However much importance must ever be attributed to the products of the soil as the basis of general business prosperity, upon which the earnings of our lines must always depend, the traffic derived directly from that source is each year of less relative importance, and the annual revenue from traffic on our lines is each year dependent in a lesser degree upon successful crops."

The cost of additional property acquired during the year, including 5.90 miles of new road, new equipment, new sidings, etc., was \$890,758.08. Of this \$431,643.74 were charged to income, and \$459,114.29 appropriated from the Kansas City, St. Louis & Chicago construction fund.

The report says: "The work of reducing the inclination of the steepest grades on our road, to which reference was made in our last report, has been continued during 1881.

The construction of a new line of railway from Godfrey to Milton, passing through Upper Alton, has been in progress during the year and is now nearly ready for the superstructure. This line will be seven miles in length, with a maximum inclination of grades of less than 32 feet per mile.

"The present line between the same points is nine miles in length, and embraces a grade of 90 feet per mile for a distance of about 2½ miles.

"This exceptionally steep grade has for many years been the source of increased cost in operating the Alton Division of our road, and the necessity for avoiding it becomes more imperative each year with increased traffic. The two lines can be operated as a double track, and the improvement will not only avoid the necessity for helping engines on that division, but will also facilitate the prompt and safe passage of trains."

Virginia Midland.

This company operates a line from Alexandria, Va., to Danville, 242 miles; a line from Manassas Junction to Strasburg, 62 miles; the Warrenton Branch, 9 miles; the Front Royal Branch, 1 mile; the Pittsville Branch, 9.5 miles, and the Franklin & Pittsylvania road, 29.5 miles, making in all 353 miles worked. It also owns a line from Strasburg to Harrisonburg, 52 miles, which is leased to the Baltimore & Ohio. The Pittsville Branch and the Franklin & Pittsylvania road are of 3 ft. gauge. Of the main line 28 miles, from Orange Court House to Charlottesville, is leased from the Charlottesville & Rapidan Company; the Franklin & Pittsylvania is also leased, but both companies are controlled by this company. The following statements for the year ending Dec. 31 were presented at the recent annual meeting:

The present company is successor through foreclosure to the Washington City, Virginia Midland & Great Southern; its stock and debt were as follows at the close of the year:

Common stock.....	\$800,000
First-preferred stock.....	1,500,000
Second-preferred stock.....	2,500,000

Total stock.....\$4,800,000

Funded debt.....7,423,282

Total.....\$12,223,282

Arrangements have been made to increase the common stock to \$6,000,000, and to issue \$4,000,000 income bonds in place of the first and second-preferred stock.

The passengers and freight carried were as follows:

	1881.	1880.	Inc.	P. c.
Passengers carried.....	274,334	196,604	77,730	39.4
Tons freight carried.....	313,852	259,272	54,580	21.1

The earnings of the road for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Gross earnings.....	\$1,422,796.51	\$1,247,417.00	I.	\$175,379.51 14.1
Expenses.....	844,720.64	865,446.65	D.	20,726.01 2.4

Net earnings.....\$578,075.87

Gross earn. per mile.....4,030.58

Net earn. per mile.....3,533.76

Per cent. of exps.....59.37

The increase in business and earnings was very considerable and is expected to continue, its causes being generally permanent.

Payments from net earnings were as follows:

Net earnings.....	\$578,075.87
New construction and improvements.....	\$87,204.27
New equipment.....	71,134.42
Expenses of reorganization.....	27,272.88
Balance.....	185,611.57
Paid interest on bonds, eight months.....	\$392,464.30
Surplus for the year.....	\$150,367.44

Pursuant to agreement the new company paid the interest on the bonds for six months prior to Jan. 1, 1881, before the reorganization was completed. This interest amounted to \$181,544.31, or \$31,176.87 more than the surplus for the year.

Pittsburgh & Castle Shannon.

This company owns a line of 3 ft. 4 in. gauge from Pittsburgh to Castle Shannon, 10 miles, including an inclined plane to the mines. The company is also a miner and shipper of coal. The following figures are from statements presented at the recent annual meeting for the year ending Dec. 31: During the year the quantities of coal transported over the road and sold were as follows: 2,558,521 bushels of coal, 527,554 bushels net coal, 570,102 bushels slack; total of 3,616,177 bushels, which was sold for \$212,844.86; the number of passengers carried, 212,524.

The earnings were as follows:

Sales of coal.....	\$212,844.86
Fares, mail and general freight on railroad.....	16,236.54
Total receipts.....	\$229,081.40
Expenses.....	181,166.50
Net earnings.....	\$47,914.90
Interest, etc.....	10,702.88
Surplus.....	\$37,212.02

The figures show a large increase in business over the previous year.

The road has been put in good condition and many improvements made.

One dividend of 2 per cent., amounting to \$9,528, was paid, and the directors believe that regular quarterly dividends can be paid hereafter.

Knox & Lincoln.

This company owns a line from Bath, Me., to Rockland, 49 miles. The statements below are from the report presented at the recent annual meeting for the year 1881.

The road was built chiefly from the proceeds of bonds issued by the towns through which it passes. Of these town bonds there were outstanding on Dec. 31 last \$2,335,750. On these bonds interest is paid by the several towns, the earnings of the road being applied as far as they will go.

The earnings for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Gross earnings.....	\$129,231.99	\$123,584.66	I.	\$5,647.33 4.6
Expenses.....	83,066.78	74,480.73	I.	8,586.05 11.6

Net earnings.....\$46,165.21

Gross earn. p. m. 2,637.39

Net " 942.15

P. c. of exps. 64.28

The expenses include all renewals and repairs. The net earnings were a little less than 2 per cent.

The increase in expenses was due to greater renewals of road and some improvements made.

Negotiations are pending for a lease of the road to the Maine Central Company, as heretofore noted.

Central Iowa.

This company operates a main line from Albia, Iowa, to Northwood, 189½ miles; the Muchachinock Branch, 1½ miles; the Grinnell & Montezuma Branch, 14 miles, and the Stony City Branch, from Marshalltown to Stony City, 39 miles, making 244 miles in all. The Grinnell & Montezuma was purchased and the Stony City Branch built last year. The following brief statement is for the year ending Dec. 31.

The stock and bonds, from the latest attainable sources, are as follows:

Common stock.....	\$2,100,000
First-preferred stock.....	907,000
Second-preferred stock.....	1,197,800

Total stock.....\$4,174,800

First-mortgage bonds.....3,700,000

Income bonds.....629,000

Total.....\$8,503,800

There are besides new bonds to be issued on new branch lines in course of construction.

The earnings for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Freight.....	\$723,909	\$696,555	I.	\$27,354 3.9
Passengers.....	218,282	212,591	I.	5,691 2.7
Other.....	59,175	52,929	I.	6,246 11.8

Total.....\$1,001,366

Expenses.....\$37,101

Net earnings.....\$962,075

Gross earn. per mile.....4,615

Net " 757

Per cent. of exps. 83.50

Expenses last year were made up of \$595,534 for operating expenses; \$228,402 for renewals, and \$13,165 for new ballasting. There was a large increase in working expenses, and the amount charged for renewals was almost twice as great as in 1880. The general increase in prices and the working of some new line may account partly for the increase in working expenses.

Louisville, New Albany & Chicago.

This company owns a line from New Albany, Ind., to Michigan City, 290 miles, and the Chicago & Indianapolis Air Line, from a point just south of Chicago to Indianapolis, 160 miles, of which 90 miles are completed and 70 under construction. The report for the year ending Dec. 31, however, includes only the line from New Albany to Michigan City, as the new division was not operated by this company until after the close of the year.

The earnings for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Passengers.....	\$196,549	\$177,666	I.	\$18,883 10.5
Freight.....	710,491	618,779	I.	91,712 14.8
Mail, etc.....	40,614	39,807	I.	807 2.0

Total.....\$947,654

Expenses.....717,083

Net earnings.....\$230,571

Gross earn. per mile.....\$324,908

Net " 795

Per cent. of expenses.....75.67

The larger part of the increase in freight earnings was during the last six months, although east-bound business had to be done during that period at about one-half the rates that were maintained in 1880, and was due to the increase of motive power and the occupancy of new depot grounds in Louisville and the continued growth of local business.

The report of President R. S. Veech says: "The management, realizing the necessity of securing their own terminal facilities and an independent entrance into both Chicago and Louisville, made an agreement of consolidation May 20 with the Chicago & Indianapolis Air-Line Railroad, which was then in course of construction from Indianapolis to Hammond, Ind., about 20 miles south of Twelfth street, Chicago, which was afterward approved and ratified by the stockholders on June 7. This road crosses our main line at Moun, 59 miles south of Michigan City and 88 miles southeast of Chicago. The consolidated company at once issued \$2,300,000 of 6 per cent. bonds, which are a lien upon the Chicago & Indianapolis Division, and \$2,000,000 of stock, under the construction contract, which was made prior to the consolidation. The price to be paid the contractor for a finished road between the points named was \$1,850,000 bonds and \$1,550,000 of the consolidated stock. The balance of the issue of bonds has been used in the purchase of motive power, rolling stock, steel rails and terminal facilities at Louisville, which include a piece of ground on Fourteenth street, 240 by 410 ft., for a freight yard, upon which have been erected two freight houses, 30 by 195 ft. each; the balance of the stock, \$450,000, was divided among the holders of the old stock, so as to equalize the values of the two properties. Ninety miles of the Chicago & Indianapolis Division, from Delphi to Maynard Junction, five miles south of Hammond, were received and paid for Dec. 16, and have been operated by our company since Jan. 9. Work on that portion of the line between Delphi and Indianapolis is being rapidly pushed forward, and it is confidently expected that our trains will be running into Indianapolis by July 1.

"A lease for 999 years has been agreed upon with the Chicago & Western Indiana Railroad Company, by the terms of which it agrees, for a fixed rental of \$84,000 per annum, to provide our company sufficient track facilities for the prompt and speedy movement of our trains between Hammond, our northern terminus, and Chicago, and certain exclusive terminal facilities, including round-house, freight-sheds 300 by 50, freight yard 800 by 100, in the heart of the city, and the joint use with other roads of its passenger depot at Twelfth street. The rental of these premises is so paid that at the expiration of 35 years they virtually belong to this company.

"The general account shows that the only indebtedness of the company, when the line is finished, will be \$5,300,000 bonds and \$5,000,000 stock on 450 miles of road (of which nearly half will be laid with steel rails). This is only a little over \$11,000 per mile. There is not one dollar of floating debt."

"The apparent increase in operating expenses and decrease in net earnings in 1881, compared with 1880, is due to the fact that the worn-out track, structures and machinery found on the road in 1880 were rebuilt and charged to construction instead of operating expenses, while much that was then in bad condition, yet good enough to run another year, was repaired during 1881 and the cost charged to repairs instead of construction, as was done the year before."

"During the past year the aim has been to charge construction and improvement account with nothing that could legitimately be charged to repairs; and the amount charged to the latter account which was last year charged to construction and improvement would reach at least \$50,000, and to that extent increases the operating expenses and decreases the net earnings as compared with last year. This was done with a view of closing the construction and improvement account as soon as possible."